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MAGAZINE

RUN

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November 1990
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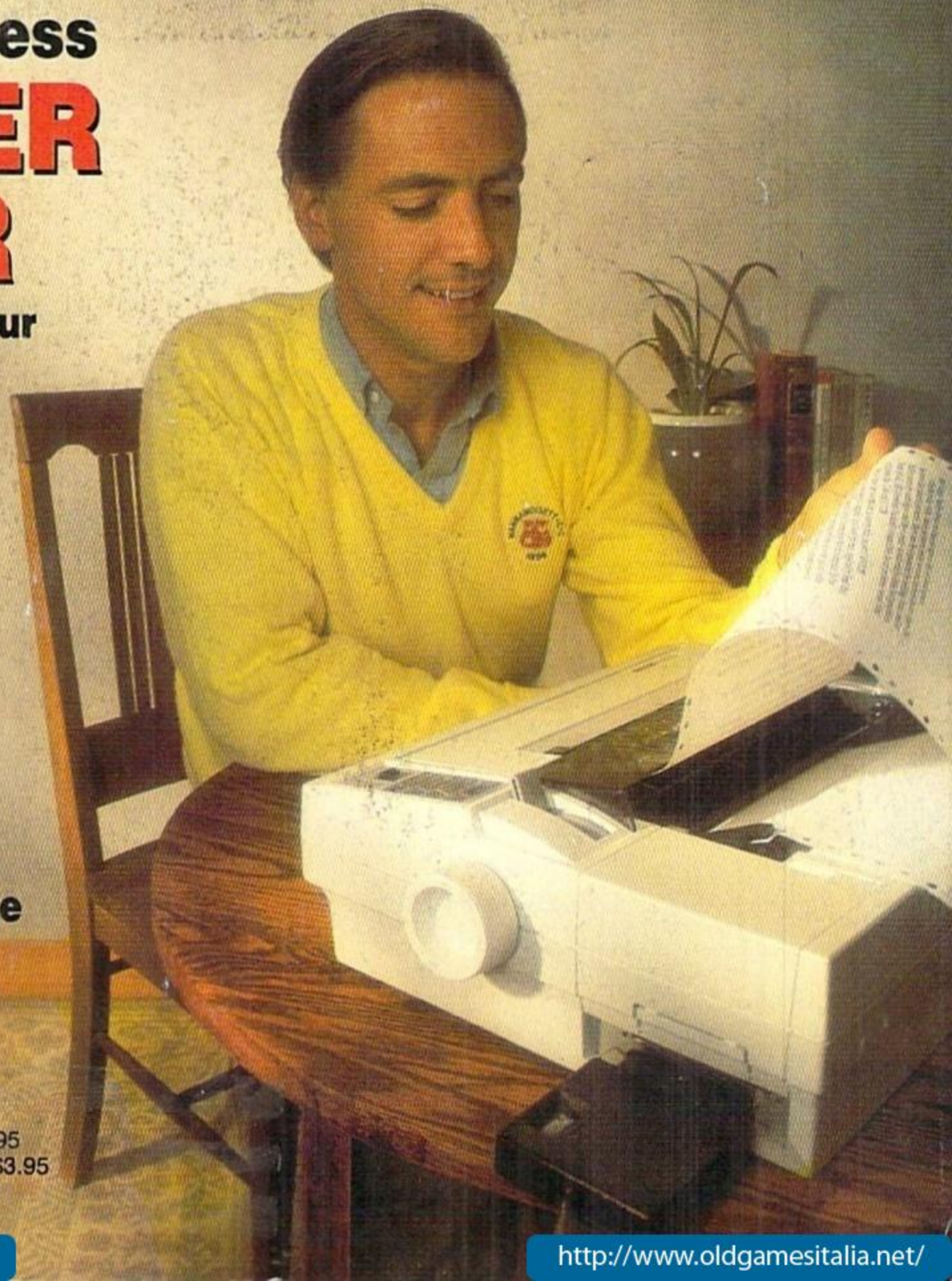

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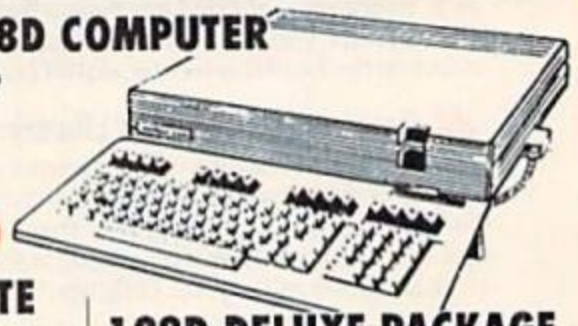

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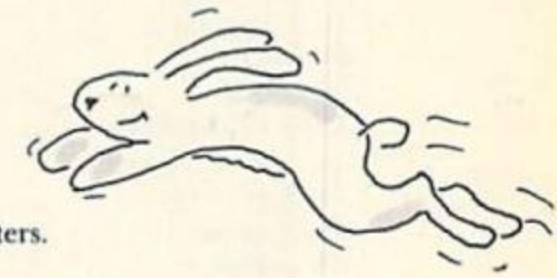

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RUNNING RUMINATIONS

64 THINGS COMMODORE USERS SHOULD BE HAPPY ABOUT

We just couldn't resist. One of the hot-selling novelty books on the market today is entitled *14,000 Things to Be Happy About*. It is one woman's lifelong list of people, places, things, events and remembrances that make her feel good.

There is much in the Commodore world that should bring a good feeling to Commodore owners. In case you've forgotten, or have been too busy to notice, here's a reminder from *RUN*'s editors about what's good about being a 64/128 user.

- the network of users' groups
- C-128D
- Commodore's built-in Basic
- 1581 disk drive
- sound and music features of the C-64/128
- fast-load cartridges
- QuantumLink and other online networks
- VIC chip
- Basic 7.0 and its sound, graphics and disk commands
- SID chip
- classic games developed for Commodore
- Commodore-compatible hard disk drives
- Kernal routines
- printer interfaces
- sprite graphics
- RAM expansion
- 128 mode
- numeric keypad
- 64/128 compatibility
- the many publications—books, pamphlets, newsletters, magazines, catalogs—available for this market
- 1351 mouse and other input devices
- kids using Commodores
- reset switch
- menu-driven programs
- 80 columns
- productivity applications
- 1571 disk drive
- function keys
- graphics characters
- abbreviated commands
- 16 colors
- ease of use
- 40/80-column dual monitors
- Peeks and Pokes
- 2 MHz
- GEOS operating system
- desktop publishing
- bulletin board systems
- *RUN* readers
- computer shows
- educational applications
- programming in Basic
- disk utilities
- surge suppressors
- laser printing
- bundled software
- keyboard overlays
- video RAM
- 2400 baud
- MS-DOS conversion programs
- high-quality joysticks
- the many developers, manufacturers and mail order houses who have supported, and continue to support, the Commodore market
- multi-function cartridges
- continued availability of Commodore 64
- modems
- games, games, games!
- bargain prices
- public domain software
- eight bits
- integrated software
- users' group newsletters
- virus-free environment
- 80-column word processing
- having your dream of owning a computer come true with the purchase of a C-64/128

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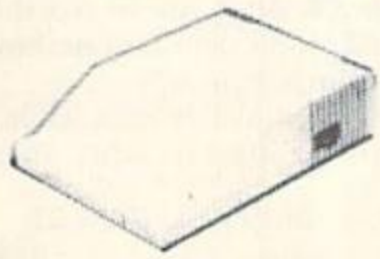

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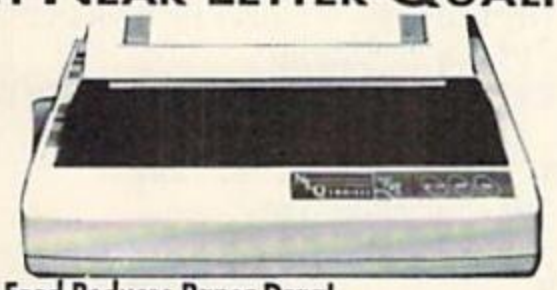

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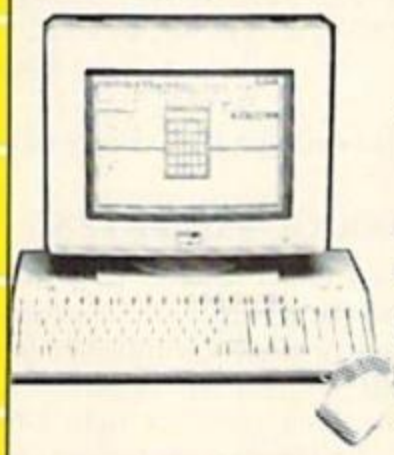

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MAGIC

Clear your C-64 screen, reverse a New command, and find the value of any memory location.

By TIM WALSH

$5A6 GATE CLEAR 64

Clearing your C-64's screen needn't be dull. Add some excitement with Gate Clear 64. After you've typed in and saved the listing, run it, and it will demonstrate how Gate Clear 64 clears the screen from side to side.

Best of all, Gate Clear 64 is completely relocatable to any memory location not already occupied by other programs.

```
Ø REM GATE CLEAR 64 - JEFFREY PANICI
                                        :REM*169
1Ø PRINTCHR$(147):FORT=1 TO 1ØØØ:PRINT".";
   :NEXT                                :REM*249
2Ø FORI=49152TO49274:READZ:POKEI,Z:CK=CK+Z
   :NEXT                                :REM*7Ø
3Ø IF CK<>13883 THEN PRINT"ERROR IN DATA..
   .":END                               :REM*61
4Ø SYS 49152                            :REM*214
5Ø DATA 162,Ø,16Ø,41,169,64,133,251,169,32
   ,157,Ø,4,153,4Ø,4,157,8Ø,4           :REM*222
6Ø DATA 153,12Ø,4,157,16Ø,4,153,2ØØ,4,157,
   24Ø,4,153,24,5,157,64,5,153          :REM*211
7Ø DATA 1Ø4,5,157,144,5,153,184,5,157,224,
   5,153,8,6,157,48,6,153,88,6          :REM*168
8Ø DATA 157,128,6,153,168,6,157,2Ø8,6,153,
   248,6,157,32,7,153,72,7,157          :REM*45
9Ø DATA 112,7,153,152,7,157,192,7,232,136,
   32,179,238,32,179,238,32,179         :REM*43
1ØØ DATA 238,32,179,238,32,179,238,32,179,
    238,32,179,238,32,179,238,32        :REM*116
11Ø DATA 179,238,32,179,238,192,Ø,2Ø8,143,
    96,153                              :REM*32
```

—JEFFREY PANICI, SANDWICH, IL

$5A7 LETTER/NUMBER GUESS 64/128

This program lets you guess either a letter or a number within a range. When you run the program, it gives you ten chances to guess a letter from A to Z or a number from 1 to 100. The computer will tell you whether to guess higher or lower after each guess. Not challenging enough? Change the value of the variables X (the number of guesses) and N (the highest number) in line 20. The program automatically adjusts itself when you change the high number range.

```
Ø REM LETTER OR NUMBER GUESS 64/128 - CALV
  IN PRESLEY                            :REM*131
1Ø INPUT"{SHFT CLR}PLAY NUMBER OR LETTER (
   N/L)";Q$                             :REM*121
2Ø X=1Ø:N=1ØØ:T=1:IF Q$=""THEN 1Ø        :REM*125
3Ø IF Q$="L"THEN N$="LETTER":M$="A-Z":N=26
   :W=65                                :REM*2Ø6
4Ø IF Q$<>"L"THEN:N$="NUMBER":M$="1 -"+STR
   $(N):W=1                             :REM*93
5Ø PRINT"{SHFT CLR}{2 CRSR DNs}{2 CRSR RTs
   }I'M THINKING OF A "N$" FROM " :REM*124
6Ø PRINT"{2 SPACEs}"M$". YOU SHOULD GUESS
   IT":PRINT"{2 SPACEs}IN"X"TRIES OR LESS"
                                        :REM*38
7Ø L=INT(RND(Ø)*N+W):PRINT:PRINT         :REM*99
8Ø AN$=STR$(L):IFW=65THENAN$=" "+CHR$(L)
                                        :REM*14
9Ø PRINT"{CRSR DN}{COMD 7}";T;:INPUT"WHAT
   IS YOUR GUESS";A$:IFA$=""THEN9Ø :REM*96
1ØØ IFW=65THENG=ASC(A$):IFG<65ORG>9ØTHEN9Ø
                                        :REM*142
11Ø IFW=1THENG=VAL(A$):IFG>NORG<1THEN9Ø
                                        :REM*6
12Ø IF G=L THEN 18Ø                     :REM*68
13Ø IF G>L THENPRINTTAB(3Ø)"{CTRL 2}LOWER"
                                        :REM*29
14Ø IF G<L THENPRINTTAB(3Ø)"{CTRL 2}HIGHER
   "                                    :REM*2Ø5
15Ø IF T>=X THEN 17Ø                     :REM*2Ø
16Ø T=T+1:GOTO 9Ø                       :REM*139
17Ø PRINT"{CRSR DN}THE ANSWER IS"AN$:GOTO1
   9Ø                                   :REM*224
18Ø PRINTTAB(3Ø)"RIGHT!!!":PRINT"YOU GUESS
   ED IT IN"T"TRIES"                    :REM*32
19Ø PRINTTAB(12)"PLAY AGAIN (Y/N)?"
                                        :REM*218
2ØØ GET P$:IF P$=""THEN 2ØØ             :REM*132
21Ø IF P$="N"THEN END                    :REM*71
22Ø IF P$<>"Y"THEN 2ØØ                   :REM*59
23Ø RUN                                 :REM*113
```

—CALVIN PRESLEY, BRIGHTON, MO

$5A8 FAST UN-NEW FOR C-64

At one time or another, every computer user has unintentionally entered the New command. This means having to reload a program—or worse, losing a program not previously saved. Unfortunately, most un-new utilities and techniques for recovering your lost program assume you've loaded one before working on a program.

Since most computer users don't bother loading an un-new utility before any other program, I wrote Auto-Un-New 64. Type in and save this program, then insert a formatted work disk and run Auto-Un-New 64. A file will be created with the name Unnew.

The next time you accidentally enter NEW, just place the work disk in the drive and type LOAD "UNNEW",8,1. The

Continued on p. 51.

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News and New Products

Explore Earth, die hard, join the Commodore users' movement, and play a full-color, C-128 80-Column mode game.

By HAROLD R. BJORNSEN

C-128 80-Column Mode Game

CHARLOTTE, VT—Silvasoft (PO Box 1006, Charlotte, VT 05445) has released an animated graphics adventure, written in Basic 8, for the C-128 in 80-Column mode. As Rodney, in **Maidstone Quest**, you've been chosen to undertake the quest for the Maidstone, an icon of power. The evil necromancer, Ganef, has stolen the icon and hidden it deep within the mines of the Grey Mountains. You must travel through 28 levels in search of clues and weapons you'll need to destroy Ganef and recover the Maidstone. An 80-column, RGB monitor, and either a C-128 with 64K VDC RAM and a 1571, or a 128D are required. $25 plus $3.50 s/h.

A Stable Situation

COSTA MESA, CA—The **Stable Owners Option Module** expands the styles and strategies of the C-64 version of Omni-Play Horse Racing. It also adds utilities that let you join the elite class of thoroughbred owners and assemble your own stable of claiming, allowance and stakes horses. You can hire jockeys, matching their skills against the competition, and enter them in races. $19.95. SportTime, 3187-G Airway Ave., Costa Mesa, CA 92626.

Now I Have A Machine Gun, Too!

MENLO PARK, CA—Based on last year's hit movie, **Die Hard** players assume the role of John McClane, the off-duty New York cop, who must race against the clock to rescue his wife and other hostages from terrorists occupying a high-rise building. As you defeat each terrorist, you'll obtain the guns and tools needed to win. It's available for the C-64 for $29.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025.

Planet Earth

WEST UPTON, MA—Edgeworth Software (PO Box 418, West Upton, MA) has

* EDGEWORTH SOFTWARE'S EARTH PROGRAM *
The earth in december (dawn view)
The sun is to the right of the screen
daylength= 14:38
nightlength= 09:22
time= 10:58
at 38S 140E
0=go H=halt F=fast S=slow X=exit

Edgeworth Software's Earth Program also contains help screens and a quiz.

expanded its **Earth Program** to a two-disk set for the C-64. Disk one generates rotating Earth graphics. By simulating sunlight and the Earth's tilt, it illustrates concepts such as the changing length of days and the four seasons.

By adding the optional disk two, users get extra screens, along with the ability to transfer graphics into some popular paint programs like RUN Paint. Disk one is priced at $19.90; disk two at $9.

Prevent Computer Crashes

RICHMOND HILL, ONTARIO, CANADA—**Stabilant 22** is an environmentally safe, nonconductive block polymer that, when applied to electromechanical contacts, helps prevent computer lockups and crashes that are caused by poor connections in the computer or keyboard. The heavy liquid improves conductivity and helps block the entry of contaminants. Price unavailable at press time. D. W. Electrochemicals, Ltd., 9005 Leslie St., Unit 106, Richmond Hill, Ontario, Canada L4B 1G7.

Computer Breakthroughs From "Science Digest"

MARS FLIGHT SIMULATOR—Planetary scientists at the Jet Propulsion Laboratory in Pasadena, California have produced a computer simulation of data sent back from NASA's exploratory spacecraft, *Viking*, as it orbited Mars. Scientists hope it renders a more complete picture of the planet than still photos can provide. The simulation "flies" viewers through Valles Marineris, a canyon that's as wide as the United States.

PERFECTLY SOUND SOUND—With the new knowledge of the physics of perfect sound that computer programs have given us, acousticians and architects are designing everything from great concert halls to quiet factories. One such computer program, developed at Cornell University, anticipates how any change in a room's design affects sound, allowing architects to evaluate different designs for sound clarity, volume and a number of other acoustic qualities.

Machine Language Doctor

NORTH ARLINGTON, NJ—Arlington Software (PO Box 916, North Arlington, NJ 07032) introduces **Code Shadow Symbolic Debugger** for the C-64. Its features help debug, test and analyze machine language programs. Symbolic capabilities provide assembling and disassembling code, program stepping and addresses referenced in command arguments. This non-copy protected program can use a RAM expansion unit to leave computer memory free. You can get your machine language programs in shape for $19.95.

Attention, C-64/128 Owners

An association of 64/128 users' groups is being formed to provide support for these 8-bit computers. The first meeting will be held during the World of Commodore/Amiga Show in Toronto from November 30 through December 31, 1990.

Some of the association's aims are to provide a united force to ensure support for the 64 and 128, to become a clearinghouse of public domain programs and newsletters and to increase buying power for 64/128 owners. For more information, write Dave Quinn c/o M.U.G., Box 2984, Stn. "A," Moncton, N.B., Canada E1C 8T8. ■

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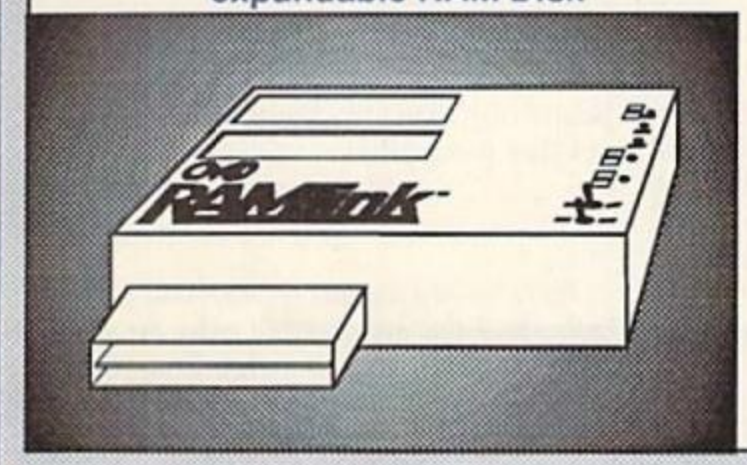

What is RAMLink?

RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REUs). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software to utilize Commodore 1700 series REU's, GEORAM, PPI's RAMDrive, and CMD's RAMCard as if it were a disk drive. Optional RAMCard installs internally and can be used alone or in combination with the storage of an external REU for a maximum capacity of 16 Megabytes.

- Supports Commodore 1700, 1764, 1750, Berkeley Softworks GEORAM and PPI's RAMDrive.
- Optional RAMCard allows RAMLink to be used as a RAM Disk with or without a separate REU. User Expandable from 1 Mb to 16 Mb using standard SIMMs.
- Pass-thru connector allows use of cartridge port peripherals such as utility cartridges.
- Reset, Disable, Direct Access mode and SWAP functions are all standard features.
- RAM port provides power back-up to REU's.
- Parallel port provides ultra-fast data transfer when connected to CMD HD series hard drives.
- Optional battery backup unit protects against power outages.

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POWERFUL FEATURES MAKE RAMLINK AND RAMDRIVE USEFUL AND AFFORDABLE

- Allows vast amounts of commercial software, including GEOS, to access your REU as a high-performance RAM Disk.
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- Separate power supply eliminates RAM data loss when turning off the computer; battery backup protects against power outages.
- Includes built-in JiffyDOS Kernal routines for high-speed disk access with JIffyDOS equipped disk drives.
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What is RAMDrive?

RAMDrive is a fresh new approach to RAM expansion for the Commodore 64 and 128. RAMDrive is a self contained battery backed cartridge with capacities of 512K, 1 Mb and 2 Mb. RAMDrive incorporates RL-DOS, an ultra-fast, easy-to-use operating system similar to the HD-DOS found in CMD HD series hard drives. This proprietary DOS allows various types of partitioning along with compatibility and speed unsurpassed by previous RAM Exapansion systems.

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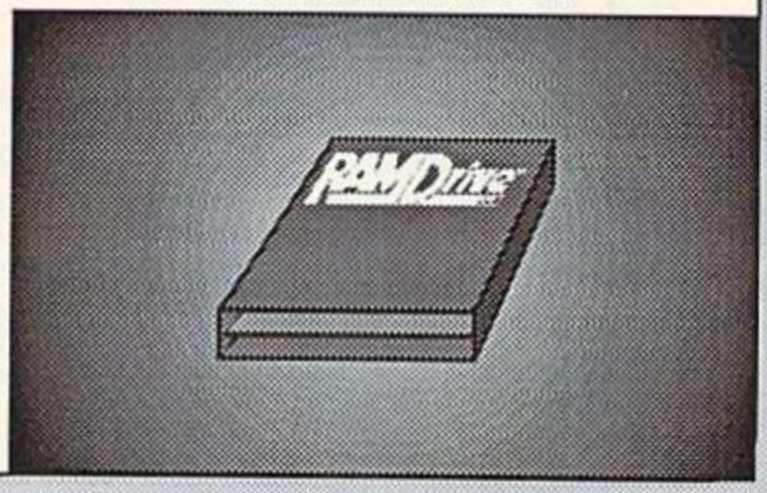

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MAIL RUN

Readers question the cost of publishing, welcome RUN*'s new productivity column, and search for Commodore's support of education.*

LETTER TO THE PUBLISHER

I've subscribed to *RUN* since the first issue, but I now find myself continuing to use my C-128 without the support of, nor the need for, a magazine that is charging the same subscription price of $22.97 for 12 issues instead of prorating its new ten-issue subscription to about $19.

Other C-64/128-specific magazines are doing quite well at maintaining their advertisers. Why is *RUN* any different? The amount of money it costs to publish a magazine of this magnitude isn't that great. The true cost is about 47 cents per copy.

—DANNY P. ASH
BAKER, LA

RUN *Publisher Stephen Robbins replies,*

"Allow me to express my appreciation for your loyal and dedicated support of RUN *magazine through the years.*

"I would like to take this opportunity to address the points you made in your letter.

"You will still receive 12 issues for the price of $22.97. I apologize for the lack of clarity surrounding this point. (See "Letter From the Publisher," RUN, *June/July 1990.)*

"Other Commodore magazines are not *doing well at maintaining their advertisers.* RUN *is the only publication remaining that serves the informational needs of the 8-bit user base.* Compute!'s Gazette *has ceased publication, and* INFO *magazine has refocused its coverage solely to target the Amiga market.*

"It is true that it costs about 47 cents to manufacture a single copy of RUN. *However, manufacturing costs are exclusive of staffing, postage, renewal notices, artwork, film development and stripping charges, equipment, telephone and fax charges, circulation management, fulfillment house costs, corporate administrative, legal and accounting services, and so forth.*

"Our printer, Brown Printing Company, who also prints Sports Illustrated *and* Time, *represents one of the largest national printers and always keeps abreast of the latest technology in printing/binding, enabling* RUN *to maintain the lowest subscription rate possible.*

"The corporate philosophy of RUN*'s parent company, International Data Group, is first and foremost to serve the informational needs of its readership.* RUN *has attempted in every way to deliver a good value for the product. Granted, the magazine has decreased in size, yet the number of editorial pages has not been affected as greatly as one might expect.*

"In order to continue publishing, RUN *must rely on its readership for financial support. It's up to the reader to decide if he is getting a fair and equitable value for the money spent in subscription fees. The magazine will not survive beyond the next few years unless its readership feels the need for the information and is willing to pay for it."*

PROTIP ACCOLADES

Someone is reading my mind. What a *great* idea for a new column! After you've compiled enough material, the ProTips column should be published in book form.

I have had the same problem with geoCalc 64 that ProTip submitter Geoffrey Sullivan described—and solved—in your August/September issue of *RUN*. Keep the column coming; I need the helpful hints it provides.

—TERRY W. BASS
HELENA, MT

Thanks for the accolades, Terry. Many wrote in appreciation for the new column. Readers who have any undocumented, clever or creative tips they use with their own commercial productivity programs—especially RUN*'s own programs—may submit them to ProTips, RUN Magazine, 80 Elm St., Peterborough, NH 03458. Be sure to state which version (if any) of a program your tip is for. If a tip is published, you'll receive a check for $5.*

—EDITORS

PROTIP QUERY

Your ProTips column in the August/September *RUN* included a tip for the Flex File 128 database program. I've searched all the ads in magazines and catalogues and have called several mail order houses, but no one seems to have heard of it. Do you know where I can get this program?

—F. C. HORN
JEKYLL ISLAND, GA

We received a number of letters and phone calls about this program. To order the Flex File 128 database, call 1-800-762-5645, or write Cardinal Software, 13646 Jefferson Davis Highway, Woodbridge, VA 22191.

—EDITORS

EDUCATION AND COMMODORE

It seems to me that Commodore, and perhaps *RUN*, have forgotten the enormous educational use of the C-64. I would like to see *RUN* provide more coverage of the educational market, with some success stories. This market, which is rejuvenated every year with new recruits, is an ongoing source of interest that you should explore.

—GRAHAM HODGKIN
DAGLISH, WESTERN AUSTRALIA

See the RUNning Ruminations column in the October 1990 issue for an editorial on Commodore and education and, in the same issue, the article, "Kidware Hit Parade," which describes RUN*'s reviewers' favorite educational packages.*

—EDITORS

WORLD OF AMIGA SHOW

I went to the World of Commodore show with high expectations. Boy, was I disappointed! All I saw at each table were Amigas running software. I was amazed at what the Amiga could do, but not to the extent that I'd ditch my C-64 system, considering that all my software and hardware would then become useless.

—DAVID M. FRIEDMAN
LARCHMONT, NY ■

A CALL TO READERS

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1541/1571 DRIVE ALIGNMENT

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SOFTWARE GALLERY

Sequels—a role-playing game and a "spirited" adventure—and sports—boat racing and football—top this month's lineup.

By BETH S. JALA

CHAMPIONS OF KRYNN ..... A–

Lots of Combat Action Will Test Your Survival Skills In this Fantasy Sequel

When the great War of the Lance ended, Takhisis was barred from the world of Krynn and her dragon legions were shattered. Never again would the Dark Queen's magic transform dragon eggs into man-like dragon fighters—or so it was believed! Your party of six volunteers had barely begun a patrol of Northeast Ansalon when they encountered rumors about an arch-mage draconian named Myrtani, who planned to create a new mutant horde.

Champions of Krynn reflects considerable refinement in the computerization of dungeon and dragon games. Unlike SSI's earlier game, Pool of Radiance, Krynn offers a single strong scenario, a clear-cut ending and even a victory celebration. To support the larger, more involved story line, you'll find on-screen text that supplements the numerous Journal and Tavern Tale readings.

Most of the action is set in the outposts, streets, dungeons, temples and towers of six cities. There you get a 3-D, forward view with coordinates and optional top-down display to aid in mapping. Aside from the fun of discovery, explorations yield assorted shops, taverns, treasures, valuable information and the inevitable hostile encounters.

If mystery, puzzles and a worthy quest are the "spice" of adventuring on Krynn, then the "meat and potatoes" is monster bashing. This translates into an on-going concern for building character attributes, and the chance to try out your party in some of the very best tactical combat available.

One of the challenges in Krynn is maneuvering individual characters against a variety of computer-directed adversaries. Beginning heroes tend to encounter goblins, bugs and other weakies, so even new players can easily learn the ropes. The real fun begins with parties of high-level warriors backed by dragons and evil spell casters!

Command a party of six to victory in Champions of Krynn.

Although supplied with extensive, illustrated manuals, Krynn's documentation is guilty of some important omissions. Keyboard input works best during combat, yet nowhere is the key pattern shown. (It's 1–8 clockwise, top number keys only.) There's also no reference to the game's initial "Disable Fastloader? (Y/N)" prompt. (Respond No to use the program's fastloader software; Yes to use a cartridge. In several timings versus a low cost cartridge, the software proved notably faster. With no cartridge, you've got a game so slow, it's almost unplayable.) Finally, remember to disconnect or turn off drive 2; otherwise, the game will eventually crash.

With colorful, partially animated graphics and good sound, Krynn follows through with absorbing, well-planned combats and a long-playing, multi-branching scenario spanning six disk sides. Expect a solid challenge to your wits as well as your sword arm when you lead the Champions of Krynn! *(Strategic Simulations, Inc.; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95.)*

—JEFF HURLBURT
HOUSTON, TX

REPORT CARD

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

GHOSTBUSTERS II ..... A–

If Spirits Invade Your Computer Screen, "Who Ya Gonna Call. . .Ghostbusters!"

After only five years of relative peace, New York City again finds itself in deep supernatural trouble. And once more, Peter, Egon, Ray and Winston must answer the call, this time in Ghostbusters II.

Inspired by the hit movie, the software has three major segments. In the first, you use the keyboard and a joystick to control a ghostbuster who dangles from a rope. His mission is to descend to the bottom of a shaft and take a sample of mood slime that flows in a subterranean river.

Making your quest hazardous are spectral hands that suddenly materialize and try to saw through the rope; meanwhile, other evil spirits strive to steal all your ghostbuster's strength and ►

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courage by shooting or grabbing him. You can use a proton beam, bombs and shields against these eerie enemies, as you search the shaft's walls for bottles of power-restoring elixir.

Successfully collecting the slime brings you to the program's second part, which takes place on Broadway. Here the Statue of Liberty protects the ghostbusters by firing her torch at all sorts of attacking horrors. She weakens when a spirit hits her, and the game's heroes must help by scooping up invigorating ooze from the remains of blasted spooks.

The software's final segment is set at the Museum of Art. Your first task is to drop the ghostbusters safely down into a gallery via a rope. Once they're there, you constantly switch from one man to another as you move them to different positions, and you also have them continually exchange weapons.

The ghostbusters' goal is the defeat of Janosz, the museum's noxious curator, and the rescue of the kidnapped Baby Oscar. The game's grand finale comes with the destruction of Vigo, the bloodthirsty fiend who's behind all of New York's paranormal problems.

The program's graphics are excellent—they include digitized pictures from the film. The animation and sound are also outstanding.

Even more impressive than the sensory effects is the game's intriguing complexity. Its superb arcade sequences are skillfully blended with some fascinating tactical challenges, making the software extremely appealing.

Be warned, however, that this is not an easy game. Also, the program will give your disk drive quite a workout.

Nevertheless, despite its potential shortcomings, players who want to kick a little ectoplasm will love Ghostbusters II. It's one program that truly delivers some "spirited" fun. *(Activision; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$29.95.)*

—WALT LATOCHA
OAK PARK, IL

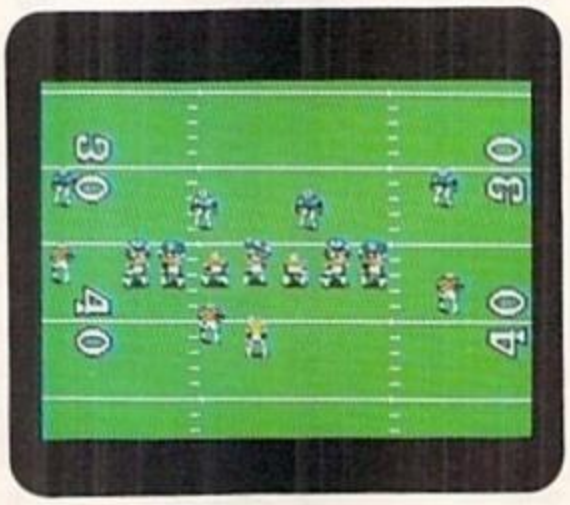
TV SPORTS FOOTBALL ..... B–

Finally Here for Your 64—Just in Time For the NFL TV Season

TV Sports Football (TVSF) is as close as an armchair quarterback can come to partcipating in a televised football game. The software contains much of the same hype and hoopla: the opening broadcast theme, the sports anchorman, sponsors and even halftime reports.

The Cinemaware Football League (CWFL) consists of 28 teams organized to resemble NFL teams. CWFL competition revolves around a 16-game season, complete with playoffs and the CWFL Championship (read: Super Bowl).

Once you've made a league data disk, you can roll up your sleeves and delve into the task of editing teams to suit your taste. Then, when you've had a



The players line up for the snap of the ball in TV Sports Football.

chance to practice with your new team, it's off to the field.

After the opening coin toss, you're presented with the play-calling screen for both offense and defense. This screen also contains the scoreboard, timeouts, quarter, down and yards-to-go information. Play selection is accomplished via joystick. Onscreen diagrams of the different formations and "canned" plays make it easy for beginners to quickly choose and execute plays. If the program doesn't detect joystick movement after a few seconds, the computer automatically takes control of the game for that play.

The scene then switches to an overhead view of about 30 yards of the field. Here you can either execute the play as designed or take control of any one of several key players prior to the ball snap.

I was surprised by how faithful the graphics and sound of TVSF are to the original Amiga version—if not in quality, then at least in content. The colorful screens are very well drawn, and the players are large and detailed enough so that they don't get lost in the crowd during play execution. While controlling the players on the field is easy enough in theory, it can be a bit tricky in practice. The joystick seems overly sensitive, so it will take time before you'll become as proficient at tackling, passing and running the ball as the computer.

My only real complaint about this game revolves around the fact that Cinemaware couldn't fit team and individual statistics into the C-64 version as they had for the Amiga. Without the stats, which, in my mind, are almost as important as playing the game itself, TVSF may be seen as just another pretty face with little substance. But, then again, what a face! *(Cinemaware; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95.)*

—JOHN RYAN
BILOXI, MS

HEATWAVE ..... B–

Landlubbers, Stay Ashore When the Power Boats Rev Up!

Heatwave is a superboat racing simulation that puts you at the helm of any of four powerful superboats: the Cougar Cat, the Warlock Cat, the Top Gun Cigarette, and for you Miami Vice fans, the Don Johnson Special. You choose one of six race courses—four are off the Miami coast, one is on the Mississippi River, and the other course is in San Francisco Bay.

You get only one pit stop per race—before you start. At the pits, you can add or remove gas, or pick up a spare propeller or shaft. Naturally, each item you add makes your boat heavier and, therefore, slower.

Piloting your superboat may prove tricky at first, but there is a practice mode to help you get your sea legs. Try to get your boat moving as quickly as possible without overheating the engine or causing damage to the shaft. Visual and audible warnings let you know when you should ease back on the throttle. Also, as you gain speed, and the boat's hull begins to lift out of the water, you must carefully adjust the trim to keep your boat from bobbing wildly over the waves—not an easy task when you're going 100 miles per hour!

Before you race, you must qualify by completing a solo run within a limited amount of time. You may also attend a drivers' meeting where you can bone up on some of the finer points of superboat racing.

Heatwave is a slick simulation but, frankly, not one of Accolade's best. The game features fairly decent graphics and makes good use of sound, but the ►

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action, while fast and furious compared to an afternoon in a sailboat, doesn't offer the same level of excitement as, say, Grand Prix Circuit. This is because,

Check out this boat to race against Don Johnson in Heatwave.

although there are four other superboats on the same course, they seem more like computer-generated props than competing racers. *(Accolade, 550 S. Winchester Blvd., Suite 200, San Jose, CA 95128. C-64/$29.95.)*

—BOB GUERRA
CHARLESTOWN, MA

AT A GLANCE

X-MEN: MADNESS IN MURDERWORLD ..... A

Professor Charles Xavier, founder of the X-Men (a band of mutant people born with extraordinary powers) has been snatched by his old foemen Magneto, Blob and the Juggernaut, and spirited off to Murderworld, the killing ground and private world of the sociopathic Arcade. To the professor's rescue come six of his students: Cyclops, Storm, Wolverine, Nightcrawler, Colossus and Dazzler.

What is unique about this program is that the gamer, rather than having to play all the way through as one of the X-Men, can switch between each of them during gameplay. This way, each character's various talents and attributes contribute to the final outcome.

Advanced gamers can attempt prowling through the 27 different levels on their own. Others might want to purchase the clue book, which contains a map of the entire maze.

Check out the users' manual if you're unfamiliar with the characters. It features several pages from Marvel's heroes and villains handbook. A 16-page Marvel comic is also included. By reading each, players will gain insight into how the X-Men work, both as individuals and as a solid fighting unit.

Perks of the program include Pause and Save features, essential in a game of this nature. X-Men is thoroughly enjoyable and totally engrossing. *(Paragon Software; distributed by Medalist International, 180 Lakefront Drive, Hunt Valley, MD 21030. C-64/$34.95.)*

—BOB SODARO ■

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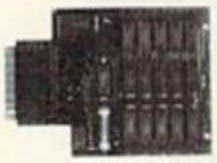

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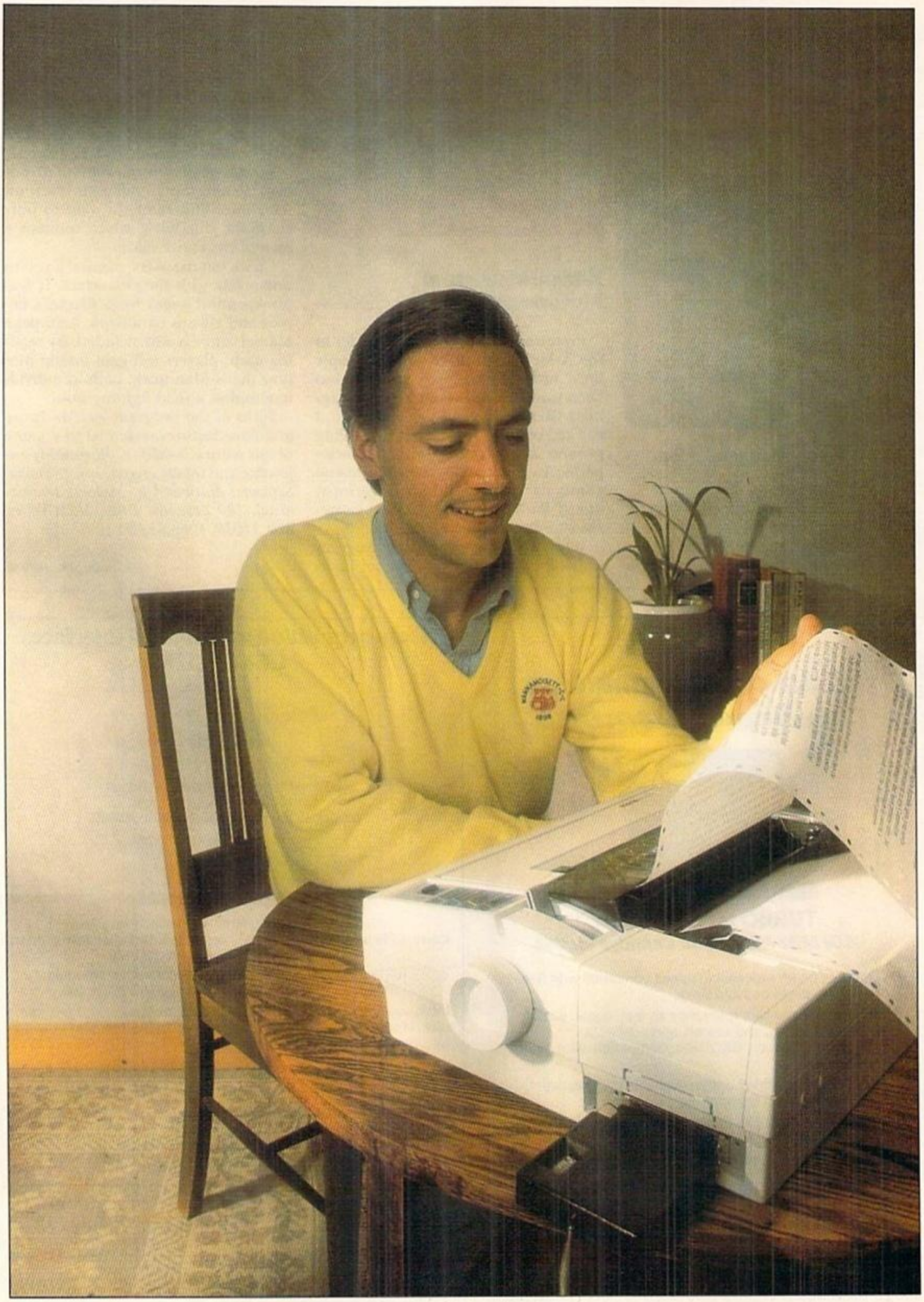

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Q&A PRINTER PRESCRIPTION

Here are the remedies to ten of your most common concerns about printers.

IN YEARS PAST, I've written printer articles covering what was new and which printers were the best investment for your hard-earned dollar. This year, I'll answer ten printer questions commonly asked by *RUN* readers. My aim is to help you find the printer that's right for your needs, and then get it to work properly with your C-64 or C-128. I'll wrap up with a look at two new low-end Commodore-compatible printers (see "Two Worth Noting" sidebar accompanying this article); but first, some general remarks.

The 9-pin printer of the 90s rivals many computer systems in technological sophistication. Four or five years ago, printer manufacturers began improving the quality of their products and increasing the number of features offered. The new printers can print faster, more quietly and in multiple fonts. They can also handle business envelopes, mailing labels and single sheets of business stationery with the greatest of ease. Older printers nearly choked on anything that deviated from continuous sheets, and many were reluctant to print on even that!

Nearly every printer available today requires a Commodore-compatible interface cable in order to be used with your computer. Commodore-dedicated printers, with their 9-pin serial cables, are rare nowadays, and any remaining should be disregarded. While they don't require a printer interface, they offer fewer features than other printers, and with only rare exceptions, are not upwardly compatible should you move on to a more advanced computer.

The Buying Process

To select the printer that best meets your needs, you should start by asking yourself some questions. Do you write a lot of letters? Would you like to create your own personalized stationery using graphic clip art? Do you plan to use a printer for a home business? For each of these needs, a good quality, low-priced, 9-pin dot matrix printer should be sufficient. If important documents constitute a majority of your printing, you should consider a higher quality 9-pin, or maybe even a 24-pin, printer. For good quality graphics and the rigors of daily continuous printing, as in a small office, you should price 24-pin printers.

Because they aren't Commodore-specific, printers can be bought at any computer store and needn't be purchased via mail order. An advantage to buying at a computer store is the opportunity to see sample printouts. Surprisingly, the quality can vary greatly among similarly priced printers from different manufacturers. Paper-handling capabilities can vary as well.

Once you've decided on the printer that best suits your needs, it's time to turn to the mail order firms to find an interface that will enable your Commodore to talk to your printer. Be sure to check several sources to get the best price.

Now on to. . .

Questions & Answers

Q. What features are most important when looking for a printer: speed, print options, compatibility or print quality?

A. Personally, I've found that no feature is as important as the quality of output. I'm willing to forego quite a few options in order to get good quality printed text and graphics.

Options are my second priority. A printer that you buy should, at the very least, print in pica (10 characters per inch), elite (12 cpi) and condensed (17 or 18 cpi). Additional features, like multiple software-selectable fonts and various printing densities make the printer more useful, but aren't crucial to most home computerists. Esoteric options, such as a quiet mode, are usually more gimmicky than practical. ►

By TIM WALSH

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PRINTER PRESCRIPTION

Don't overlook compatibility, especially when using software packages such as GEOS (which relies on printer drivers). An effort has been made in recent years to build Epson-code compatibility into new printers, because most software programs offer Epson support. However, it's still possible to buy a printer, especially a color model, that won't print properly with your Commodore, at least not without a lot of software and DIP-switch tweaking.

Speed is most important if you work under tight deadlines or do a lot of printing. Unfortunately, high speed and great looking print are mutually exclusive, except in the rarefied atmosphere of laser printers, which are often beyond the financial means of Commodore computerists.

Q. My friend's PC-compatible computer uses a generic Centronics parallel cable to connect to the printer. Why does my C-64 require a hard-to-find printer interface?

A. Commodore 8-bit computers lack the Centronics parallel printer port enjoyed by PC-compatibles and many other computers. Over the years, the best solution to this dilemma has been the Commodore-compatible printer interface, which connects to the 9-pin serial port of your disk drive or computer. Most printer interfaces are not equipped with a power supply, so they usually rely on the cassette port as a power source.

Q. How does a 24-pin dot matrix printer differ from a 9-pin dot matrix printer?

2 WORTH

THE STAR MICRONICS NX-2410 MULTI-FONT

Star's NX-2410 and sample printout.

The Star NX-2410 Multi-Font is a good 24-pin printer that will fit even the smallest of budgets. A near-clone of the Star NX-2400 24-pin printer that *RUN* reviewed one year ago ("Making an Impression with Printers," November 1989), the NX-2410 offers plenty of printing options for the money.

The NX-2410 has an elaborate control panel with four control buttons that activate many different print options. For example, you can select from four letter quality fonts (including a nicely detailed Script font), Italics, three print pitches and Quiet mode, to name but a few.

Paper handling options are also plentiful: Remove the paper guide to place single sheets into the printer and pull the bail lever to let the printer automatically load the paper. Best of all, a paper-parking feature is included. Select the Park option (hold down the Quiet button and press the Paper Feed button) from the control panel, and the continuous forms are retracted and parked in place, allowing single sheets to be loaded.

Power up the NX-2410 and, unlike most other printers that start off in Draft mode, you'll find the printer defaults to Letter Quality mode. While this is convenient if you rarely print anything except final copies, most users prefer to make multiple draft copies of their work for close scrutiny. It's a little cumbersome to select Draft mode manually (a minimum of four button presses on the control panel), but it will conserve the life of both the printhead and the ribbon.

The NX-2410 boasts one significant improvement: darker print quality than its predecessor. Combine that feature with the many fonts it offers, good paper handling and a budget price, and you've got a great 24-pin printer to match up with your Commodore.

COMMENTS AND OBSERVATIONS

The NX-2410 prints graphics and text fairly well, although slowly in comparison to other 9- and 24-pin printers. The leisurely printing pace is tolerable; more annoying is the fact that the printer powers up in Letter Quality mode. If you rarely print in this mode, you'll get plenty of practice switching modes on the control panel before printing.

Printing on stationery and labels is easy with the NX-2410, while its paper handling is not as sophisticated as the Citizen 200GX (reviewed opposite). In comparison with other 24-pin printers, the NX-2410 definitely qualifies under middle-of-the-pack. But, its low price makes it a reasonable and attractive purchase for a newcomer to the world of 24-pin printers.

Regardless of its few shortcomings, the NX-2410 remains a good printer, with many print options. In fact, it possesses more print options than even the most talented Commodore users will put to use. Add that to 24-pin printing and a low price, and the NX-2410 is a good bet for Commodore users.

NX-2410 SPECS

Maximum printing speed: 150 cps, in Draft Pica mode
Emulation modes: Epson LQ-800 and IBM Proprinter X24
Fonts: Courier, Prestige, Orator, Script
LQ matrix: 24 × 35 (pica)
Horizontal Bit Image modes: 60, 80, 90, 120, 180, 240 and 360 dots per inch
Programmable line spacing: 1/6, 1/8 or programmable in 1/60", 1/72", 1/180", 1/216" or 1/360"-inch increments
Size: 4.7 H × 16.1 W × 12.9 D
Weight: 14.1 lbs.
Price: $399

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PRINTER PRESCRIPTION

A. The printhead in a 24-pin model creates images with 24 pins, arranged in a matrix of rows and columns; the printhead in a 9-pin model uses 9 pins. While the output of 9-pin printers once lacked quality as compared to 24-pin printers, that's no longer the case. Thanks to advances in technology, there's now very little discernible difference between the types. Many 9-pins presently also incorporate the automatic paper handling that was once the exclusive domain of 24-pin printers.

In spite of these advancements, 24-pin printers still hold an advantage when it comes to durability. Because they're designed with sturdier components, they're ideal for busy offices where they get continuous use.

Q. Is it practical for a C-64 or C-128 user to invest in a laser printer that costs several times more than the rest of his or her computer system?

A. The answer to that question depends on your needs. Laser printers create wonderfully detailed graphics, print several times faster than the fastest dot matrix printers, and can be expanded by adding font and buffer memory cartridges. If you need these features without requiring a 16-bit computer, a laser printer to go with your Commodore will be worthwhile. And Hewlett-Packard-compatible laser printers work fine with the C-64 and C-128. However, most Commodore computerists who need these features have also outgrown their 8-bit machine. ►

NOTING

THE CITIZEN 200GX

Citizen's 200GX and sample printout.

The Citizen 200GX represents a new generation of 9-pin printers. Fast (240 cps) and packed with options, the 200GX is one of the more interesting printers on the market.

For starters, it offers Epson FX-850 and IBM Proprinter III emulation. While this might not appeal to every Commodore owner, you'll appreciate the emulation options if you ever upgrade to another computer. In addition to multiple printer emulation, fast printing and great paper handling options, what really sets the 200GX apart from the rest of the pack is its Command-Vue II control panel.

Unlike conventional printer control panels, the Command-Vue II consists of LED-type lights and a sliding switch that lets you choose menu options easily and quickly. You can select one of four main menu features (Online, Pitch, Font and Install) from this unique control panel. Each of these main options consists of four sub-options, making a combination of 16 print options available. A quiet mode, normally found on pricey 24-pin printers, is also provided.

Three fonts (Roman, Sans Serif and Courier) are available from either the previously mentioned control panel or through software commands. A total of seven print pitches are offered: 10, 12 and 15 cpi or proportional from the control panel and three pitches (13.3, 17 and 20 cpi) via software commands.

Of all the options, my favorite is being able to quickly convert from a monochrome (black and white) printer into a color printer. Citizen offers a GSX 140/Swift 24 Color Kit for the 200GX, consisting of a color ribbon and a small electric motor. With the ribbon and motor (which can be installed in about one minute) and the flip of a DIP switch, the 200GX becomes a color printer. Even with the kit in place and activated, the 200GX retains all the options it had before the color was installed.

COMMENTS AND OBSERVATIONS

When used on a daily basis, the 200GX will quickly spoil even the casual C-64/128 user. It's enjoyable to work with and less clumsy than the NX-2410 in most respects, especially paper handling. When you turn the printer on, it automatically busies itself positioning and aligning the paper, something unheard of in low-end printers up until about two years ago.

Printing on stationery is remarkably easy. Just pop the paper guide on top, select the Paper Parking option from the Command-Vue II menu, and you're on your way. The many printing features you can select with the Command-Vue II Menu option places the 200GX in a class by itself.

You wouldn't expect so many options and such ease of use to be packed into a 9-pin printer. The 200GX is a wonderful printer and ranks as one of the best I've used. Fast, quiet and loaded with features, the 200GX is a true marvel!

CITIZEN 200GX SPECS

Maximum printing speed: 240 cps, in Super High-Speed mode at 15 cpi
Emulation modes: Epson FX-850 and IBM Proprinter III
Fonts: Roman, Sans Serif, Courier
NLQ matrix: 18 × 18 dots
Horizontal Bit Image modes: 60, 72, 80, 90, 120, 144 and 240 dots per inch
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PRINTER PRESCRIPTION

I see only two disadvantages to owning a laser printer: the cash outlay for the printer, and the fact that they're large and occupy a lot of desk space.

Q. What type of printer is best for GEOS? Also, what is a GEOS printer driver, and how is it used?

A. GEOS employs techniques and terminology different from most other software programs. When you print a document with most C-64/128 word processors and other application programs, you're using the Text or Character mode of the printer. With GEOS, you're printing a bit-mapped screen using the Graphics mode of the printer, and Graphics mode requires special codes from the computer. First, the computer must set the printer to Graphics mode in order to print the bit map. Then it has to send a small series of commands so the printer receives the data and creates the image properly. Because these commands differ from printer to printer, a special driver is needed for each printer.

As I mentioned earlier, most newer printers use Epson codes, so you can create satisfactory printouts using virtually any of GEOS's Epson printer drivers. If you have an older, Commodore-compatible printer, you can print with any of GEOS's Commodore-compatible printer drivers.

Q. What's the difference between the fonts provided by my software and the fonts provided by the newer printers and font cartridges?

A. In nearly all cases, software creates fonts by duplicating, pixel by pixel, the bit-mapped screen on the printer. Not only is this the method employed by GEOS, it is also a common practice with graphics programs, banner makers and many other software packages. With a late-model, high quality 9- or 24-pin printer, the output is usually acceptable for all but the most important of documents. When using older, less versatile dot matrix printers, however, software fonts often make some parts of the document look darker than others. Consequently, software-generated fonts are more amateurish in appearance than those created internally by the printer.

A newer printer's built-in fonts are not only of uniform quality but also proportionally spaced—that is, the space occupied by two letter i's is less than the space occupied by two letter m's. Such printing gives documents a better appearance than printing with older model printers that lack proportional printing capability.

Q. Are color printers a good investment, and do they work well with the C-64 and C-128?

A. A color printer is a good investment, if you need one for your work or for creating calendars, greeting cards or other works of art. Most of the color printers that are Epson code-compatible will print in color with software packages like GEOS. The secret is to use the Epson JX-80 printer driver; the JX-80 printer codes are still employed by Epson-compatible color printers.

Q. How do I program my printer to print the way I want? Codes in the manual, such as ESC "4", make no sense to me.

A. This is one of the questions I hear most frequently. There's one surefire solution to this problem: Learn how to convert the ASCII codes presented in the manual to their decimal equivalents, and then learn the proper syntax for sending them to your printer.

Before you ask the computer to send a command to the printer, the computer has to understand the command. Nearly all the printer manuals written today assume that you're using an IBM or IBM-compatible computer that requires no translation of these commands into another syntax that the computer will understand. The ESC "4" command in the sample above makes perfect sense to a PC-compatible, but no sense to your Commodore. Another consideration is that your printer interface must be in Transparent or ASCII mode in order for the commands to travel from the computer to the printer without any conversions occurring. Finally, if you're sending commands from outside a software package, you must open a channel to the printer.

For demonstration purposes, a Star NX-1000 II printer requires the following command sequence to print in Near Letter Quality (NLQ) mode using Sans Serif characters:

```
ESC "k" 1
```

First you must be certain that the printer interface is in Transparent mode. Check your interface manual to see how this is done. It usually involves just flipping a DIP switch or two on the interface.

Next you must convert all the ASCII values in the command to decimal values. Check the printer manual, which provides reference numbers and decimal equivalents, to find the decimal numbers needed.

Finally, open a channel to the printer, precede the decimal numbers with the CHR$ (character string) command, enclose the values within parentheses, and then close the channel to the printer. The line appears as follows in Direct mode:

```
OPEN 4,4: PRINT#4, CHR$(27);CHR$(107);CHR$(1):CLOSE 4
```

To use the same command within a word processor, you'd have to make some slight adjustments. As an example, let's use *RUN*'s word processor, RUN Script.

First you'd use the .pr dot command to send printer commands from within RUN Script to the printer. Again, ensure that your printer interface is in Transparent or ASCII mode, and then enter the following dot command sequence:

```
.pr7,27,107,1
```

Note the inclusion of a 7 at the beginning of the command. This is the secondary address for the printer.

Q. I'm interested in doing desktop publishing on my Commodore. Which printer should I consider for this work?

A. Ultimately, a laser printer is the logical choice, but you can produce acceptable documents with a good dot matrix printer and a desktop publishing package like geoPublish. You can also use the dot matrix printer to produce proofs of your document, then take your disk to a users' group or friend with a Commodore and a laser printer to get a top quality final product.

Q. There's been a lot of talk about letter quality and near letter quality printing. What are these two types of output?

A. A few years ago, letter quality referred to the print generated by typewriters and daisy wheel printers. Now, daisy wheel printers, which are essentially daisy wheel typewriters lacking a keyboard, are obsolete, and letter quality printing refers to the excellent output from 24-pin dot matrix printers. Some of the better 9-pin printers from manufacturers such as Okidata, Panasonic and Epson are also capable of first-rate characters and graphics.

I hope my answers will help you select a printer and then use it to best advantage. It may take some time and effort to learn to use all your printer's capabilities, but turning out superb documents will make it all worthwhile. ■

Tim Walsh is RUN*'s technical manager and resident printer guru.*

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Printer Controller 64/128

Here's an easy way to dress up your printouts with Italics, Bold and many other options.

Style's pull-down secondary menu.

By WILLIAM McLEOD

Today's sophisticated dot matrix printers require a hundred or more commands to fully utilize their capabilities, and many printing options remain unused because of the time required to look up and invoke the commands. Consequently, we settle for pedestrian printouts instead of the more attractive styles that are available. I developed Control Printer 64/128 to make it easier to use printer options by making it simpler to input printer control codes.

Control Printer 64/128 runs on the C-64 or C-128 (40 or 80 columns), automatically configuring itself to either computer. The program was written for the Star Micronics NP-10 and compatible printers, but many of the commands work with most other parallel printers. Control Printer can be easily modified for use with other printers. As written, it *won't* work with Commodore-dedicated printers.

Control Printer is entirely menu-driven. After typing in Listing 1, using *RUN*'s Checksum program to look for typing errors, save it to disk, then run it. The top line of the first screen presents the main menu: Style, Margins, Utility and Quit. As indicated by a command line at the bottom of the screen, you make a selection by using the cursor-right key to highlight your choice and then pressing the return key. Selecting Style displays a pull-down secondary menu of 11 styles of printing. Make your choice, press return, and your printer will be configured to that feature. Of course, the printer must be connected and turned on for the selection to work.

You can enter several commands, such as Elite, Italics, Expanded and Boldface, and the printer will combine them all and retain them until it is shut off or reset.

After you've made your selection of styles, press return, and you'll go back to the main menu. Now select Utility and press return; then choose and execute View Printout. The printer will print a list of the styles selected and a short sentence illustrating the style combination, with the paper rolling up an inch, so you can see what was printed. The Sample Printout option prints the same thing without rolling the paper up. If you haven't selected a style, the printer will respond with Pica, as this is the default on most printers.

The Margins menu is for setting margins, of course. However, it also lets you set the printer to skip over perforations and provide paging.

At any time, you can save your work to disk by typing RUN 20 and pressing return. Line 20 establishes the name of the program, 30 scratches the old version, and 40 saves the new version. If you make changes in the program, you should change line 20 to ZZ$= "1PRINTER" or some other name in order to preserve the original.

Making Changes

You can change the titles in the main menu by changing the Data statements in line 120, but don't change END in line 130, as it serves as a terminator for the array. The menu is limited to four titles of 18 characters each for the C-128 in 80-Column mode and seven characters in 40-Column or 64 mode. Anything longer will automatically be truncated. If you want more than four items in the main menu, you're on your own, as this requires extensive alterations to Control Printer 64/128.

Data for the Style menu is found in lines 220–230, Margins in 320–330 and Utility in 420–430. Each of their secondary menus can handle up to 11 titles, so there's room for a total of 11 more commands—five in the Margins menu and six in the Utility menu.

To add a command to the Margins menu, add the command's title to line 330 and its subroutine starting on line 1790, erasing the REM and using the same format as in the other command routines. Each new routine must start at the next available REM in that menu, and it must not occupy a line already containing a REM.

New commands that require entering a column number should be placed in the Margins menu, as it is equipped for that type of input. Of course, you can delete any menu item and substitute your own in its place.

Printer Commands

If Control Printer 64/128 runs all right, but the printer isn't responding properly, the interface probably isn't in Transparent or Semi-Transparent mode. This is handled throughout the program with an OPEN 5,4,S command, where S is set to 5 in line 90. Most interfaces use 5 as a secondary address for Transparent mode, but that number does vary. Consult your interface manual and change line 90 or flip the necessary DIP switches on your ►

RUN it right: **C-64 or C-128; printer**

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printer interface for either Transparent or Semi-Transparent mode.

Now we get down to the actual printer commands. First, run through all the menus to become familiar with the procedure. You'll find that it's very easy. Next, reset the printer and exit to the main menu. Now try each of the styles in turn, printing a sample and resetting the printer each time.

If any command fails to print correctly, look at lines 1000–1320, and note that each group of lines is labeled with its title and that the second line in each group is the command line. For emphasized print, the command is PRINT#5, C$"E", where C$ is previously defined as CHR$(27). Most of the codes use C$. The code C$"E" can also be written CHR$(27);CHR$(69), where CHR$(69) is the code for the letter E. Look up the code for emphasized print in your printer manual, and enter it in place of C$"E". Any other printer commands that fail to work can be handled in a similar manner, assuming that your printer supports that style. All commands for the Margins menu start at line 1520, and those for the Utility menu start at 1820.

All of this is reasonably straightforward, except for the addition of line 1670 to disable the interface control for the right-hand margin. If your interface doesn't have a disable command, you may be able to set it at a high number such as 150 or 200.

Using the Program

For use with a word processor, set up the printer as desired before loading the word processor. The printer will retain the combination you set, but it's always possible that the word processor will have ideas of its own. In that case, look in the word processor's manual for a way to prevent that software from doing its own printer initialization.

By using Elite, Condensed and Subscripts commands and reducing linespacing to one-twelfth inch, you can produce a disk directory that can be pasted on the front of the disk sleeve. The type is quite readable, because it's a dense black. Just type LOAD"$",8 and return, then OPEN 4,4:CMD4:LIST.

Double-height letters are ideal for name tags, and quad height works fine for posters. Form feed is great for printing out listings of long programs without printing over the perforations. You'll find many other uses for Control Printer 64/128, as you gain experience with it. Besides that, it's fun just printing out all the combinations of styles. R

William McLeod, a young 80-year-old, lists electronics and computer programming among his hobbies.

Listing 1. Control Printer 64/128 program. (Available on ReRUN disk. See order card facing page 48.)

```
5 REM CONTROL YOUR PRINTER - WI
  LLIAM MCLEOD              :REM*73
10 GOTO50                   :REM*140
20 ZZ$="PRINTER"            :REM*236
30 OPEN15,8,15,"S0:"+ZZ$ :REM*9
40 CLOSE15:SAVE ZZ$,8:END
                            :REM*150
50 DIM P$(13),HP$(13),A$(13),M$
   (11),HM$(11)             :REM*76
60 L=9:T=9:LL=39:A=PEEK(215):IF
    A=128 THEN L=19:T=19:LL=79:
   FAST                     :REM*25
70 I=1:H$="{CTRL 9}":N$="{CTRL
   0}":RM=80                :REM*196
80 Z$=CHR$(29):R$=CHR$(13):C$=C
   HR$(27):CU$=CHR$(145):CD$=CH
   R$(17)                   :REM*123
90 S=5: REM TRANSPARENT MODE
                            :REM*201
100 POKE53280,0:POKE53281,0
                            :REM*148
110 READ N$(I):REM MAIN MENU
                            :REM*129
120 DATA STYLE,MARGINS,UTILITY,
    QUIT                    :REM*167
130 DATA END                :REM*138
140 IF N$(I)="END" THEN K=I-1:G
    OTO170                  :REM*37
150 N$(I)="{2 SPACEs}"+N$(I)+"{
    18 SPACEs}":N$(I)=LEFT$(N$(
    I),L)                   :REM*123
160 I=I+1:GOTO110           :REM*16
170 FORI=1TOK+1             :REM*180
180 H$(I)=H$+N$(I)+N$       :REM*190
190 NEXT                    :REM*65
200 K=1:REM STYLE           :REM*50
210 READ P$(K)              :REM*119
220 DATA EXIT,ELITE,ITALICS,CON
    DENSED,PROPORTIONAL,EXPANDE
    D,EMPHASIZED            :REM*232
230 DATA BOLDFACE,SUBSCRIPTS,SU
    PERSCRIPTS,DOUBLE HIGH,QUAD
     HIGH                   :REM*104
240 DATA END                :REM*244
250 IF P$(K)="END" THEN J1=K-1:
    GOTO280                 :REM*46
260 P$(K)=" "+P$(K)+"{14 SPACEs
    }":P$(K)=LEFT$(P$(K),19)
                            :REM*213
270 K=K+1:GOTO210           :REM*110
280 FOR K=1 TO J1           :REM*91
290 HP$(K)=H$+P$(K)+N$:NEXT
                            :REM*188
300 K=1:REM MARGINS         :REM*196
310 READ M$(K)              :REM*213
320 DATA EXIT,TOP MARGIN,BOTTOM
     MARGIN,LEFT MARGIN,RIGHT M
    ARGIN                   :REM*224
330 DATA LINE SPACING N/216,FOR
    M FEED                  :REM*113
340 DATA END                :REM*95
350 IFM$(K)="END"THEN J2=K-1:GO
    TO380                   :REM*173
360 M$(K)=" "+M$(K)+"{14 SPACEs
    }":M$(K)=LEFT$(M$(K),19)
                            :REM*57
370 K=K+1:GOTO310           :REM*250
380 FOR K=1 TO J2           :REM*176
390 HM$(K)=H$+M$(K)+N$:NEXT
                            :REM*120
400 K=1:REM UTILITY         :REM*126
410 READ G$(K)              :REM*46
420 DATA EXIT,RESET PRINTER,SLA
    SH ZERO,PAPER OUT SIG OFF
                            :REM*120
430 DATA SAMPLE PRINTOUT,PRINT
    AND VIEW                :REM*136
440 DATA END                :REM*187
450 IFG$(K)="END"THEN J3=K-1:GO
    TO480                   :REM*47
460 G$(K)=" "+G$(K)+"{14 SPACEs
    }":G$(K)=LEFT$(G$(K),19)
                            :REM*99
470 K=K+1:GOTO410           :REM*69
480 FOR K=1 TO J3           :REM*42
490 HG$(K)=H$+G$(K)+N$:NEXT
                            :REM*18
500 REM MAIN MENU           :REM*167
510 G=0:PRINT"{SHFT CLR}{CTRL 8
    }"                      :REM*2
520 PRINT H$(1);N$(2);N$(3);N$(
    4)                      :REM*156
530 FORK=1TOLL:PRINT"{COMD T}";
    :NEXT                   :REM*209
540 PRINT"{HOME}":FOR I=1TO21:P
    RINT:NEXT               :REM*232
550 IFA=128GOTO570          :REM*156
560 PRINT"{CTRL 9} CURSOR RT TO
     SELECT, RETURN TO EXECUTE
    ":PRINT"{HOME}":GOTO590
                            :REM*86
570 PRINT"{CTRL 9}{12 SPACEs}<C
    URSOR RIGHT> TO SELECT{12 S
    PACEs}<RETURN>";        :REM*136
580 PRINT"{CTRL 9} TO EXECUTE{1
    3 SPACEs}"CHR$(19):PRINT:PR
    INT                     :REM*240
590 I=1:GOSUB680:IF X$=R$ GOTO7
    30                      :REM*78
600 PRINTN$(1);H$(2);N$(3);N$(4
    )                       :REM*240
610 I=2:GOSUB680:IF X$=R$ GOTO7
    30                      :REM*181
620 PRINTN$(1);N$(2);H$(3);N$(4
    )                       :REM*128
630 I=3:GOSUB680:IF X$=R$ GOTO7
    30                      :REM*156
640 PRINTN$(1);N$(2);N$(3);H$(4
    )                       :REM*144
650 I=4:GOSUB680:IF X$=R$ GOTO7
```


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PRINTER CONTROLLER

```
    3Ø                      :REM*139
66Ø PRINTH$(1);N$(2);N$(3);N$(4
    )                       :REM*17
67Ø GOTO59Ø                 :REM*248
68Ø GET X$:IF X$="" GOTO68Ø
                            :REM*4Ø
69Ø IF X$=Z$ THEN PRINT CU$;CU$
    ;CU$:RETURN             :REM*121
7ØØ IFX$=R$ THEN RETURN:REM*14Ø
71Ø PRINT"{SHFT CLR}":PRINTTAB(
    1Ø)"{CTRL 9} PRESS CURSOR R
    IGHT OR RETURN"         :REM*4
72Ø FOR Y=1TO3ØØØ:NEXT:GOTO51Ø
                            :REM*37
73Ø ON I GOTO74Ø,76Ø,78Ø,8ØØ
                            :REM*251
74Ø GOSUB83Ø:IF G=1 GOTO51Ø
                            :REM*42
75Ø GOTO74Ø                 :REM*68
76Ø GOSUB134Ø:IF G=1 GOTO51Ø
                            :REM*1Ø6
77Ø GOTO76Ø                 :REM*94
78Ø GOSUB183Ø:IF G=1 GOTO51Ø
                            :REM*75
79Ø GOTO78Ø                 :REM*112
8ØØ TA=INT(LL/2)-5          :REM*61
81Ø CLOSE5:PRINT"{SHFT CLR}":PR
    INT:PRINT:PRINT:PRINT:PRINT
    TAB(TA)"***END***":END
                            :REM*97
82Ø REM STYLE MENU          :REM*34
83Ø PRINT:TT=Ø:PRINT"{CTRL 5}":
    PRINTCU$:GOSUB238Ø      :REM*146
84Ø PRINT P$(1)             :REM*127
85Ø FOR K=2 TO J1:PRINT HP$(K):
    NEXT                    :REM*75
86Ø REM STYLE SELECTOR      :REM*5
87Ø FOR K=1 TO J1:GOSUB233Ø
                            :REM*65
88Ø IF X$=CD$ GOTO9ØØ       :REM*238
89Ø GOTO96Ø                 :REM*21Ø
9ØØ PRINTCHR$(19):PRINT:PRINT:P
    RINT:IFK=1 GOTO92Ø      :REM*89
91Ø FORI=1TOK-1:PRINTCD$;:NEXT
                            :REM*126
92Ø IF K=J1 GOTO94Ø         :REM*16
93Ø PRINTHP$(K):PRINTP$(K+1):GO
    TO95Ø                   :REM*66
94Ø PRINT HP$(K):PRINTCHR$(19):
    PRINT:PRINT:PRINT:PRINTP$(1
    ):GOTO87Ø               :REM*19
95Ø NEXT                    :REM*6Ø
96Ø OPEN5,4,S:REM TRANSPARENT M
    ODE                     :REM*164
97Ø ON K GOSUB 99Ø,1ØØØ,1Ø3Ø,1Ø
    6Ø,1Ø9Ø,112Ø,115Ø,118Ø,121Ø
    ,124Ø,127Ø,13ØØ         :REM*196
98Ø CLOSE5:PRINT"{SHFT CLR}":RE
    TURN                    :REM*219
99Ø G=1:GOTO98Ø             :REM*1
1ØØØ A$(2)="ELITE, ":REM PICA I
     S DEFAULT              :REM*229
1Ø1Ø PRINT#5,C$"M"          :REM*36
1Ø2Ø RETURN                 :REM*142
1Ø3Ø A$(3)="ITALICS, "      :REM*223
1Ø4Ø PRINT#5,C$;"4"         :REM*116
1Ø5Ø RETURN                 :REM*172
1Ø6Ø A$(4)="CONDENSED, ":REM*94
1Ø7Ø PRINT#5,CHR$(15)       :REM*116
1Ø8Ø RETURN                 :REM*194
1Ø9Ø A$(5)="PROPORTIONAL, "
                            :REM*182
11ØØ PRINT#5,C$;CHR$(112);CHR$(
    1)                      :REM*113
111Ø RETURN                 :REM*224
112Ø A$(6)="EXPANDED, "     :REM*64
113Ø PRINT#5,C$"W1"         :REM*154
114Ø RETURN                  :REM*7
115Ø A$(7)="EMPHASIZED, "
                            :REM*234
116Ø PRINT#5,C$"E"          :REM*134
117Ø RETURN                 :REM*37
118Ø A$(8)="BOLDFACE, ":REM*129
119Ø PRINT#5,C$"G"          :REM*178
12ØØ RETURN                 :REM*59
121Ø A$(9)="SUBSCRIPTS, "
                            :REM*36
122Ø PRINT#5,C$"S1"         :REM*216
123Ø RETURN                 :REM*89
124Ø A$(1Ø)="SUPERSCRIPTS, "
                            :REM*251
125Ø PRINT#5,C$"SØ"         :REM*23Ø
126Ø RETURN                 :REM*127
127Ø A$(11)="DOUBLE HIGH, "
                            :REM*186
128Ø PRINT#5,C$;CHR$(1Ø4);CHR$(
    1)                      :REM*5Ø
129Ø RETURN                 :REM*157
13ØØ A$(12)="QUAD HIGH, "
                            :REM*58
131Ø PRINT#5,C$;CHR$(1Ø4);CHR$(
    2)                      :REM*1ØØ
132Ø RETURN                 :REM*179
133Ø REM MARGINS MENU       :REM*234
134Ø TT=T:PRINT"{COMD 7}":GOSUB
    238Ø                    :REM*64
135Ø PRINTTAB(TT)M$(1)      :REM*138
136Ø FOR K=2 TO J2:PRINTTAB(TT)
    HM$(K):NEXT             :REM*234
137Ø REM MARGINS SELECTOR
                            :REM*16
138Ø FOR K=1 TO J2:GOSUB233Ø
                            :REM*126
139Ø IF X$=CD$ GOTO 141Ø:REM*62
14ØØ GOTO148Ø               :REM*199
141Ø PRINTCHR$(19):PRINT:PRINT:
    PRINT:IFK=1 GOTO143Ø
                            :REM*163
142Ø FORI=1TOK-1:PRINTCD$;:NEXT
                            :REM*126
143Ø IF K=J2 GOTO146Ø       :REM*246
144Ø PRINTTAB(TT)HM$(K):PRINTTA
    B(TT)M$(K+1):GOTO147Ø
                            :REM*226
145Ø PRINTTAB(TT)HM$(K):REM*179
146Ø PRINTCHR$(19):PRINT CD$;CD
    $;CD$;TAB(TT)M$(1):GOTO138
    Ø                       :REM*99
147Ø NEXT                   :REM*7Ø
148Ø OPEN5,4,S              :REM*249
149Ø ON K GOSUB 151Ø,153Ø,157Ø,
    161Ø,165Ø,171Ø,175Ø,179Ø
                            :REM*91
15ØØ CLOSE5:PRINT"{SHFT CLR}":P
    RINT:PRINT:RETURN :REM*2Ø8
151Ø G=1:GOTO15ØØ:REM BLANK
                            :REM*13Ø
152Ø REM TOP MARGIN         :REM*12Ø
153Ø GOSUB18ØØ:PRINTTAB(L):INPU
    T"TOP MARGIN";TM        :REM*33
154Ø PRINT#5,C$;CHR$(114);CHR$(
    TM);:PRINT#5,CHR$(12):REM
    FORM FEED               :REM*127
155Ø RETURN                 :REM*154
156Ø REM BOTTOM MARGIN      :REM*116
157Ø GOSUB18ØØ:PRINTTAB(L):INPU
    T"BOTTOM MARGIN";BM
                            :REM*167
158Ø PRINT#5,C$;CHR$(78);CHR$(B
    M)                      :REM*236
159Ø RETURN                 :REM*194
16ØØ REM LEFT MARGIN        :REM*211
161Ø GOSUB18ØØ:PRINTTAB(L):INPU
    T"COLUMN NUMBER";LM:REM*86
162Ø PRINT#5,C$;CHR$(1Ø8);CHR$(
    LM)                     :REM*164
163Ø RETURN                 :REM*234
164Ø REM RIGHT MARGIN       :REM*149
165Ø OPEN 1,4:PRINT#1,C$;"R";CH
    R$(Ø):CLOSE 1           :REM*188
166Ø REM DISABLE RIGHT MARGIN
                            :REM*193
167Ø GOSUB18ØØ:PRINTTAB(L):INPU
    T"COLUMN NUMBER";RM:REM*65
168Ø PRINT#5,C$;CHR$(81);CHR$(R
    M)                      :REM*198
169Ø RETURN                  :REM*47
17ØØ REM LINE SPACING N/216 INC
    HES                     :REM*131
171Ø GOSUB18ØØ:INPUT"LINE SPACI
    NG N/216 INCHES - ENTER N"
    ;N                       :REM*67
172Ø PRINT#5,C$;CHR$(51);CHR$(N
    )                       :REM*225
173Ø RETURN                  :REM*87
174Ø REM FORM FEED          :REM*163
175Ø GOSUB18ØØ:PRINTTAB(2Ø):INP
    UT"TOTAL MARGIN";TM:PRINT#
    5,C$;"N";CHR$(TM)       :REM*4Ø
176Ø PRINT#5,CHR$(12)        :REM*6
177Ø RETURN                 :REM*127
178Ø REM ADD NEW COMMAND ROUTIN
    ES STARTING AT 179Ø
                            :REM*181
179Ø REM                    :REM*138
18ØØ PRINT"{HOME}":FOR J=1 TO J
    2-1:PRINT CD$:NEXT      :REM*34
181Ø RETURN                 :REM*167
182Ø REM UTILITY MENU       :REM*1Ø3
183Ø TT=2*T:PRINT"{CTRL 6}":GOS
    UB238Ø                  :REM*224
184Ø PRINTTAB(TT)G$(1)      :REM*114
185Ø FOR K=2 TO J3:PRINTTAB(TT)
    HG$(K):NEXT             :REM*117
186Ø REM UTILITY SELECTOR
                            :REM*24Ø
187Ø FOR K=1 TO J3:GOSUB233Ø
                            :REM*115
188Ø IF X$=CD$ GOTO 19ØØ:REM*4'
189Ø GOTO197Ø               :REM*2Ø6
19ØØ PRINTCHR$(19):PRINT:PRINT:
    PRINT:IFK=1 GOTO192Ø
                            :REM*111
191Ø FORI=1TOK-1:PRINTCD$;:NEXT
                             :REM*2
192Ø IF K=J3 GOTO194Ø       :REM*241
193Ø PRINTTAB(TT)HG$(K):PRINTTA ►
```


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PRINTER CONTROLLER

```
    B(TT)G$(K+1):GOTO196Ø
                        :REM*167
194Ø PRINTTAB(TT)HG$(K):REM*113
195Ø PRINTCHR$(19):PRINT:PRINT:
    PRINT:PRINTTAB(TT)G$(1):GO
    TO187Ø              :REM*152
196Ø NEXT                :REM*34
197Ø OPEN5,4,S          :REM*2Ø9
198Ø ON K GOSUB 2ØØØ,2Ø2Ø,2Ø6Ø,
    2Ø9Ø,211Ø,218Ø,226Ø
                        :REM*125
199Ø CLOSE5:PRINT"{SHFT CLR}":P
    RINT:PRINT:RETURN :REM*2ØØ
2ØØØ G=1:GOTO199Ø       :REM*195
2Ø1Ø REM RESET PRINTER :REM*251
2Ø2Ø PRINT#5,C$;CHR$(64);
                        :REM*169
2Ø3Ø FOR K=1 TO 12:A$(K)="":NEX
    T:REM CLEAR         :REM*1Ø2
2Ø4Ø RETURN             :REM*142
2Ø5Ø REM SLASH ZERO      :REM*29
2Ø6Ø PRINT#5,C$;CHR$(126);CHR$(
    1)                   :REM*99
2Ø7Ø RETURN             :REM*172
2Ø8Ø REM DISABLE PAPER OUT SIGN
    AL                   :REM*84
2Ø9Ø PRINT#5,C$;CHR$(56):REM*38
21ØØ RETURN             :REM*2Ø2
211Ø OPEN4,4:CMD4:REM SAMPLE PR
    INTOUT              :REM*137
212Ø IF A$(2)=""THEN A$(2)="PIC
    A, "                :REM*33
213Ø PRINT"THIS IS ";    :REM*45
214Ø FOR K=2 TO 12:PRINT A$(K);
    :NEXT:PRINT         :REM*39
215Ø PRINT"THE QUICK BROWN FOX
    JUMPS OVER THE LAZY DOG.
                        :REM*36
216Ø PRINT#4:CLOSE4     :REM*175
217Ø RETURN              :REM*1
218Ø GOSUB211Ø:REM VIEW PRINTOU
    T                   :REM*163
219Ø PRINT#5,C$;CHR$(74);CHR$(2
    16):REM PAPER UP    :REM*245
22ØØ IF A=128 GOTO222Ø  :REM*199
221Ø FOR K=1TO 93ØØ:NEXT:GOTO22
    3Ø                  :REM*112
222Ø FORK=1TO 655Ø:NEXT:REM 128
     DELAY              :REM*12Ø
223Ø PRINT#5,C$;CHR$(1Ø6);CHR$(
    216):REM PAPER DOWN 1 INCH
                        :REM*55
224Ø RETURN             :REM*71
225Ø REM ADD NEW COMMANDS BELOW
                        :REM*255
226Ø REM                :REM*1Ø6
232Ø REM SELECTOR       :REM*195
233Ø GETX$:IF X$=""GOTO233Ø
                        :REM*46
234Ø IF X$=R$ THEN J=K:RETURN
                        :REM*21
235Ø IF X$<>CD$ AND X$<>R$ THEN
     233Ø               :REM*24Ø
236Ø RETURN             :REM*2Ø7
237Ø REM MENUS           :REM*29
238Ø PRINTCHR$(19):FOR I=1TO21:
    PRINT:NEXT          :REM*154
239Ø IF A=128 GOTO241Ø :REM*19Ø
24ØØ PRINT "{CTRL 9} CURSOR DN
    TO SELECT, RETURN TO EXECU
    TE ":GOTO243Ø       :REM*243
241Ø PRINT"{CTRL 9}{12 SPACEs}<
    CURSOR DOWN> TO SELECT{11
    SPACEs}";           :REM*2Ø5
242Ø PRINT"{CTRL 9} <RETURN> TO
     EXECUTE{14 SPACEs}"
                        :REM*81
243Ø PRINTCHR$(19):PRINT:PRINT
                        :REM*75
244Ø FORK=1 TO 19:PRINTTAB(TT)"
    {CTRL 9} ";:NEXT:PRINT
                        :REM*2Ø
245Ø RETURN             :REM*42
```

■

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Free Software

Public domain and shareware programs are often overlooked as software that's high quality and inexpensive.

By STEPHEN DIRSCHAUER

Since the C-64's introduction, a voluminous library of commercial software has been available to run on it. Perhaps that's why most C-64 users have neglected another substantial source of programs: the public domain. Virtually thousands of C-64 and C-128 public domain programs are available, from disk utilities to arcade games, and they're all free. Who could ask for a better deal? Many inexpensive shareware programs also exist. In this article, I'll describe several popular public domain and shareware programs, as well as a few ways to obtain them.

Before I begin, a short explanation of terms is in order. A *public domain program* is just that: a program that has been donated to the public by its author. It can be copied or distributed in any manner, but it may not be sold legally, for one simple reason: No one owns it.

Another form of software, similar but not identical to public domain software, has no universally accepted name, but I like *free access software*. It's like public domain software with one exception: The author has decided to retain the copyright on the work. The program can still be distributed freely.

Shareware is similar to both public domain and free access software in one respect: It can be distributed in any way. Like free access software, the author retains the copyright on the work. However, a shareware author also expects some money from users. After a reasonable period of time to try out the program, the user must decide whether to stop using it or to send the author a shareware donation, usually in the range of $5 to $25. In return, the author will often send a manual or an expanded version of the program, available only to those who have sent in the donation. You might also come across variations on the shareware concept such as *charityware*. Be sure to read a program's documentation to find out exactly what it is.

Now I'll take you on a brief tour of a few of the better public domain and shareware programs available—the ones I feel best illustrate the variety and quality of the software. Rest assured, there's more where these came from!

Stereoplayer

Stereoplayer, Mark Dickenson's free access SID-player, is one of the best freely available programs for the C-64. It plays all normal and enhanced SID music files, but its many extras are what makes Stereoplayer special. For instance, a built-in turbo loader is included, as well as support for multiple drives. When you run the program, you'll be treated to an entertaining introduction, which I won't describe so as not to spoil the surprise. As its name suggests, Stereoplayer can play SIDs in stereo if you have an extra SID chip or a special cartridge, such as The SID Symphony Stereo Cartridge from Dr. Evil Laboratories (PO Box 3432, Redmond, WA 98073-3432).

BBI Basic Editor

BBI Basic Editor, by Alex Howell, is a handy little utility for Basic programmers. It weighs in at a meager 11 blocks, but don't let the small size deceive you—the program has several well-done features, my favorite being bidirectional scrolling. With it, you can scroll the screen up or down to view your Basic program without having to list it. You can also enter Basic lines up to three screen lines long without resorting to clumsy command abbreviations.

Juggler

The animation program, Juggler, is ►

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just as impressive as its Amiga namesake, and it proves that the C-64 is still no graphics lightweight. It depicts a robotic juggler balancing three crystal spheres, all in high resolution. There are actually two C-64 versions of Juggler available. The author of the original, whose online persona is RATT, drew all the animation frames by hand. Jeff Litz later produced a faster version using the original's graphics. If you're interested in C-64 graphics, I'd strongly suggest you take a look at Juggler.

CS-DOS

There are also many public domain and shareware programs available for the C-128, and the great majority of them are of high quality. Chris Smeets' DOS shell, CS-DOS, is a case in point. It's best described as an alternative environment with an interface similar to that of CP/M or MS-DOS. Indeed, it offers many features of those operating systems that the standard Commodore DOS lacks. For example, CS-DOS can execute powerful batch files from disk, all the while preserving whatever is in memory. Included among the many CS-DOS files are a terminal program and a C-128 version of the popular ARC file compressor. (Smeets is also the author of the C-64 version of ARC.)

CS-DOS is shareware: You have one month to evaluate the program, and then you must send in a very reasonable shareware donation of $20 to honorably continue using it.

GeoWar

In addition to software for the 64 and 128 Native modes, there's a long list of GEOS public domain and shareware programs, from geoWrite utilities to animation programs. One excellent geoProgram is Lysle E. Shields' geoWar, a strategy game in the spirit of Risk. In fact, anyone who's ever played Risk will feel right at home here, with one to six players fighting to conquer the world. All selections are made via the standard GEOS point-and-click interface; you hardly need to touch the keyboard, except to save and load games. GeoWar is another shareware program, with a suggested donation of $10.

Sources

Now that I've described a few examples and, I hope, whetted your appetite for public domain and shareware programs, let's see how you can get them. There are, as I've said, several ways. The two most popular sources of public domain software are disk collections and telecommunications networks.

Most public domain and shareware programs are available on large networks, such as Q-Link and CompuServe (see Table 1), or on smaller, local bulletin board systems. In fact, all the programs mentioned above came from BBSs in my area. Besides the low cost (many BBSs are free, and commercial networks charge only a few dollars an hour), this method is by far the fastest. Many programs, even large ones, can be downloaded to your computer in just a few minutes—and all you need is a telephone line, terminal program and modem. (If you don't own a modem, this is the perfect excuse to get one!)

If you don't have a modem or live in a small town where there are no local BBSs, you may want to investigate the public domain and shareware disk collections offered by users' groups and private companies (see Table 1). They typically charge from six to ten dollars per disk, to cover the cost of the blank and the copying. The compilers of these disks have usually selected popular, high-quality programs, saving you the trouble of trying out a dozen mediocre programs before finding the one you want. And, of course, since public domain and shareware programs can be freely distributed, you can exchange copies with other C-64/128 owners.

Tips & Tricks

With the enormous number of public

Q-Link Sextet

By SAUL COHEN

Club Caribe is a marvelous multiperson interactive fantasy game that's played online. Upon accessing the club, you choose an identity, then pick up the magic crystal and enter the doorway to begin your adventure. While you can be just an observer, it's much more fun to take part in touring the island. There are even guides to help you on your way. Dialogue is presented as cartoon captions.

Once you know the island, you can join search parties and competitions or simply sit back and have some fun! Believe me, you'll really feel like you're on an island adventure. To join Club Caribe, you need software that can be either ordered on disk from the Q-Link offices or downloaded from the network. After linking the software to your Q-Link disk, you're ready to log on.

Location: Just for Fun / Gaming Connection / Club Caribe / Club Caribe Travel Guide / Club Caribe Software / Download Club Caribe Software / Download the Club Caribe Linker or Download Club Caribe Data File / filenames: CC and CCDATA; from: Q-Link; date: 9/11/89; 20 and 593 blocks.

Labeler is a quick, three-line label program to enter, edit and save labels. It also prints single or multiple labels or the entire label file using your printer's normal font.

Enter, edit, save and print labels with Labeler.

Location: CSS / GEOS ARENA / Software Library / User Applications / Part 3 / filename: LABELER; from JohnW53; by: John White; date: 12/29/89; 13 blocks.

You'll need lightning reflexes to fend off an **Alien Attack**. This game for your C-128 in 40-Column mode features great graphics and smooth scrolling.

Location: CSS / Software Libraries / Browse C-128 Software / Game World / Games / Shoot-'em Up / filename: ALIEN.ARC; from:TerryR10; date: 1/16/90; 43 blocks.

Reconcile is a geoCalc template file that can help you reconcile your checkbook to your bank statement. The tem-

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domain and shareware programs available, some good and some bad, you may wonder if there are ways to zero in on the very best. Unfortunately, there's no surefire method, but here are a few tips you can follow to ensure that your library contains more treasures than turkeys:

- Find out what the most popular programs are. Many other C-64 and C-128 users have searched before you, and you may hear them mentioning a certain program often. Or a program might be on the "top downloads" list maintained by many networks and even by some BBSs.
- Try to get as much information on a prospective program as possible. For example, many BBSs have online information detailing program features.
- Ask! If you're looking for a good database program, for instance, post a message on a local BBS or ask around at your users' group. Someone might already have just the program you need.

Above all, don't be afraid to explore the many public domain and shareware programs out there. The cost of doing so is low, and you might find some jewels that are just what you need. ■

Stephen Dirschauer enjoys telecommunicating, especially when downloading public domain and shareware programs.

Table 1. Sources of public domain software.

ONLINE SERVICES:

CompuServe
PO Box 20212
5000 Arlington Center Blvd.
Columbus, OH 43220
800-848-8199

Delphi
Three Blackstone St.
Cambridge, MA 02139
800-544-4005

GEnie
401 N. Washington St.
Rockville, MD 20850
800-638-9636

PeopleLink
3215 N. Frontage Rd., Suite 1505
Arlington Heights, IL 60004
800-524-0100

QuantumLink
8620 Westwood Center Drive
Vienna, VA 22180
800-392-8200

USERS' GROUPS/COMPANIES:

Fog International Computer Users' Group
PO Box 3474
Daly City, CA 94015
415-755-2000

JLH Company
PO Box 67021, Dept. 4
Topeka, KS 66667
913-234-3388

Poseidon Electronics
103 Waverly Place
New York, NY 10011
212-777-9515

TPUG (Toronto PET Users' Group), Inc.
5334 Yonge St., Box 116
Willowdale, Ontario
Canada M2N 6M2
416-253-9637

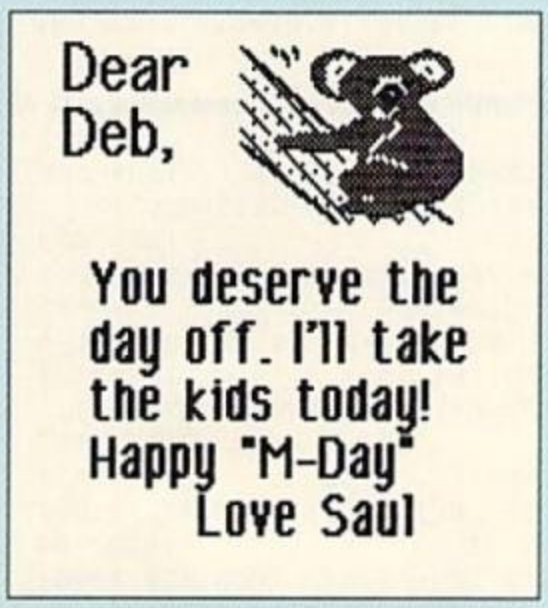
Here's a sampling of what's available from QuantumLink, one of many sources of public domain software.

plate consists of a series of predefined cells—all you have to do is enter your values and return to the first screen to see if your checkbook and the bank statement agree. Reconcile is by far the quickest and simplest template I have ever used!

Location: CSS / GEOS ARENA / Software Libraries / User Applications / Part 3 / filename: RECONCILE; from: RAB46; date: 12/30/89; 42 blocks.

GeoPrint is Roger Lu's fine card- and banner-making program. After dissolving and converting the working demo, enter your message and small graphics in a geoPaint form file that's been customized for your printer. Then use the master program to print your banner or the paint pages driver so you can further customize your creations. Ordering instructions are included in the information file that is presented before you download.

Location: CSS / GEOS ARENA / Software Libraries / User Applications / Part 3 / filename: GEOPRINTDEMO.SDA; from and by: Roger Lu; date: 12/16/89; 124 blocks.



Make special days memorable by creating cards with geoPrint.

Online persona, Leven1, has scored again with a computer adaptation of one of my all-time favorite kid's games: **Tiddlywinks**! All you have to do is judge the distance and snap the chip into the shot glass! Think it's easy? Give it a try! You'll find that both you and your kids will be amused for hours!

Location: QCC / Software Library / Browse C-64 Software / Game World / Arcade / Other / filename: TIDDLYWINKS; from and by: Leven1; date: 1/29/90; 26 blocks. ■

Saul Cohen, a GEOS and geoPublish teacher on Q-Link, also teaches a college-level desktop publishing course.

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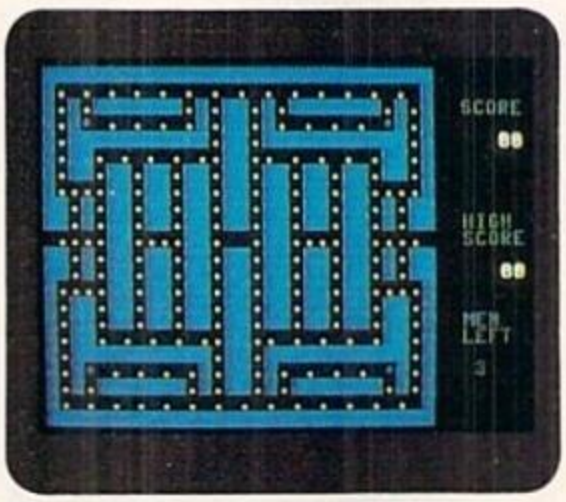
Plaque Man

Forget Pac Man—sink your teeth into this fast-action, arcade game!

By DAVID MARTIN

Plaque Man is a fun-filled, fast-paced C-64 derivation of the popular arcade game Pac Man. The object of the game is to maneuver the white tooth through the on-screen maze, collecting enamel molecules—the small white dots—and earning points as you go. Sounds simple, doesn't it? Well, it isn't, thanks to the ever-present plaque. The globs of plaque are after the tooth and, if they make contact, it dies.

The plaque's intelligence level makes it almost impossible to avoid. Your best bet is to eat one of the red fluoride pills located near the four corners of the maze. Absorbing a fluoride pill enables your tooth to destroy the plaque, and you earn extra points.



Those white dots of enamel will earn you points, but beware the ever-present plaque!

You begin the game with three teeth. After completing a level without losing all three, the action speeds up, and you earn an extra tooth.

Type in Listing 1, using *RUN*'s Checksum program to look for typing errors, and save it to a freshly formatted disk. Then type in Listing 2, also using the Checksum program, and run it to create the Plaque Man machine language program called DM. To play, plug a joystick into port 2; then load and run Listing 1 to load and boot the machine language program.

That's all there is to it. Just remember the Golden Rule: Brush often and take your fluoride pills! R

David Martin enjoys using his Commodore computers to write utilities, to program and to telecommunicate.

Running Instructions: **Type in Listing 1 and save it to disk. Type in Listing 2, save it to disk and run it to create DM. Load and run Listing 1 to boot DM.**

Listing 1. Plaque Man boot program. (Available on ReRUN disk. See order card facing page 48.)

```
1 REM BOOT DATAMAN      :REM*136
2 DATA 169,8,162,8,16Ø,8,32,186
  ,255                  :REM*1Ø4
3 DATA 169,2,162,9Ø,16Ø,3,32,18
  9                     :REM*57
4 DATA 255,169,Ø,32,213,255,134
  ,45,132               :REM*131
5 DATA 46,76,16,8,68,77:REM*25Ø
6 FORI=828TO859:READX:POKEI,X:N
  EXT                   :REM*91
7 SYS828                :REM*137
```

Listing 2. MAKE.PLAQUE ML program. (Available on ReRUN disk. See order card facing page 48.)

```
Ø REM THIS LIST 1 CREATES (AND
  SHOULD NOT BE CALLED) DM
                        :REM*72
5 OPEN 8,8,8,"DM,P,W"   :REM*244
6 CT=Ø:PRINT"{SHFT CLR}":REM*56
1Ø READ A$:IF A$="-1" THEN CLOS
  E8:PRINT:PRINT"ALL DONE!":EN
  D                     :REM*129
12 PRINT"{HOME}READING LINE "+S
  TR$(CT):CT=CT+1       :REM*141
15 IF LEN(A$)<62 THEN 55
                        :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
  2Ø)+MID$(A$,43,2Ø)    :REM*242
25 FOR I=1 TO 3Ø        :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55             :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55             :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*67
5Ø NEXT:GOTO 1Ø         :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
  O 7Ø                  :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
  A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
  )):GOTO 7Ø            :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
  Ø)+RIGHT$(A$,LEN(A$)-42)
                        :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55             :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55             :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*148
95 NEXT:GOTO 1Ø         :REM*16Ø
1ØØ REM HEX DATA FOR PLAQUEMAN ►
```

RUN it right: **C-64; joystick**

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PLAQUE MAN

```
    64                          :REM*189
101 DATA 100820378203E08AD00*D
    01865FB38E9013 8C920*8D00D0A
    D01D01865FC38               :REM*136
102 DATA E9013 8C9308D01D04C91*0
    820C8122065116 0A91F*8D15D0A
    99C8DF807A988               :REM*46
103 DATA 8D00D0A9888D01D0A901*8
    D27D0207108608AD00DC*2904D00
    320BC08608AD00              :REM*18
104 DATA DC2902D00320E40860A9*0
    78544A90A8545A90785*FDA9008
    5FEA9C085FF60               :REM*16
105 DATA AD00DC2901D00320 1D09*6
    0E6FA2098 0FA5FA25FD*C5FDD02
    BE6FEA5FE2903               :REM*35
106 DATA 85FEA5FF18A9988DF807*4
    CFE08AD00DC2908D003*200F1086
    0A9005FBA901                :REM*177
107 DATA 85FCA9C885FF60A644A0*3
    F88D0FDCAD0F8AD00D0*2907D0B
    7AD01D02907D0               :REM*108
108 DATA B04C610BA90185FBA902*8
    5FCA9CC85FF60A90285*FBA9018
    5FCA9C085FF60               :REM*235
109 DATA C6F8A5F82903D014E6F9*A
    5F92907A9028DA4D88D*BBD88DF
    CDA8D13DB4C16               :REM*146
110 DATA 08A90185FBA9005FCA9*C
    485FF60A200BD0004C9*20D005A
    9419D0004BD00               :REM*43
111 DATA 05C920D005A9419D0005*B
    D005C920D005A9419D*0006BD0
    007C920D005A9               :REM*123
112 DATA 419D007CAD0CDA200BD*0
    004C941D005A9019D00*D8BD005
    5C941D005A901               :REM*18
113 DATA 9D00D9BD0006C941D005*A
    9019D00DABD007C941*D005A90
    19D00DBCAD0CD               :REM*204
114 DATA 6078A9018D0DDCA93385*0
    1A0FFB900D099002B9*00D1990
    021B900D49900               :REM*252
115 DATA 24B900D59900 2588C0FF*D
    0E3A93785 1A9818D0D*DC586 0A
    D11D0091 8D11               :REM*55
116 DATA D0A9188D18D0A900 8D21*D
    0A900 8D20D0A900A535*29F04A4
    A4A4A18693 8D               :REM*6
117 DATA 2706A53429F04A4A4A4A*1
    8693 8D2806A53329F0*4A4A4A4
    A18693 8D2906               :REM*39
118 DATA A53229F04A4A4A4A1869*3
    08D2A06A53129F04A4A*4A4A186
    93 8D2B06A530               :REM*88
119 DATA 29F04A4A4A4A18693 8D*2
    C066 0A200BD39139D00*04BDA41
    59D0005BD3914               :REM*45
120 DATA 9D0006BDA4169D0007A9*0
    69D00D89D00D99D00DA*9D00DBC
    AD0D7202A0920               :REM*49
121 DATA 95092 C909A9018D27DA*8
    D28DA8D29DA8D2ADA8D*2BDA8D2
    CDA8D2DDAA930               :REM*244
122 DATA 8D2D06AD2706C930D03C*A
    9608D2706AD2806C930*D03 A96
    08D2806AD2906               :REM*34
123 DATA C930D024A9608D2906AD*2
    A06C930D018AD2A06C9*30D011A
    9608D2B06AD2C06             :REM*159
124 DATA 06C930D005A9608D2B06*A
    900852AA94 8DA4048D*BB048DF
    C068D13 7A51F               :REM*89
125 DATA 18693 8D1A074C910D86*E
    0A51238E91 8512A513*38E93 8
    513A5124A4A4A               :REM*4
126 DATA 8512A5134A4A4A8513A9*0
    48515A613CAA9001869*289002E
    615CAD0F61865               :REM*32
127 DATA 12900 2E6158514A000B1*1
    48516A027B1148517A0*28B1148
    518A029B11485               :REM*73
128 DATA 19A05 B114851AA6E06 *A
    D00D08512AD01D08513*20E90AA
    518C940D00320               :REM*245
129 DATA E80BA518C941D0114C0E*0
    CA51BF0DDC61BA9208D*04D44C4
    20BA960A02891               :REM*44
130 DATA 14A516C9600F004C9431 0*0
    32086 8A517C9600F004*C9431 00
    32 5B 8A519C9               :REM*230
131 DATA 60F004C9431 032B1 8*A
    51AC9600F004C9431 03*2066 8A
    5FBC902D028A5               :REM*118
132 DATA 19C9600F056C9433052A9*0
    185FB4C0B0CA5FCC902*D034A51
    AC9600F03FC943              :REM*1
133 DATA 303BA90185FC4C0B0CA5*F
    BD0E5A517C9600F02AC9*43302 64
    CB90BA90085F1               :REM*135
134 DATA A54585F0A9078D27D0A9*0
    8850A60A5FCD00DA516*C9600F00
    7C9433003 4CD0              :REM*93
135 DATA 0B4C1608E62AA52AC9DC*D
    022E61F2037 0A204B11*4C210CC
    644A544D004A9               :REM*101
136 DATA 018544C645A545D004A9*0
    185454C1608209A11A5*1BD02CE
    61CA51C29 0385              :REM*92
137 DATA 1CAABD92118D00D4A907*8
    D01D4A9228D05D4A9D1*8D06D4A
    9218D04D4A90F               :REM*56
138 DATA 8D18D4A902851B4C6F0B*A
    900850 2AD15D029 2F0*26AD02D
    01869 738ED00               :REM*81
139 DATA D09 1A38C90FB015AD03*D
    01869 738ED01D09009*C90FB00
    5A502909026 0AD             :REM*85
140 DATA 15D029 4F026AD04D018*6
    9738ED00D09 1A38C9*0FB015A
    D05D018690738               :REM*142
141 DATA ED1D09009C90FB005A5*0
    209046 0AD15D029 8F0*26AD06D
    01869 738ED00               :REM*204
142 DATA D09 1A38C90FB015AD07*D
    01869 738ED01D09009*C90FB00
    5A502909086 0AD             :REM*46
143 DATA 15D0291 0F026AD08D018*6
    9738ED00D09 1A38C9*0FB015A
    D09D018690738               :REM*136
144 DATA ED1D09009C90FB005A5*0
    2091 06 0A9006 0A99C8D*F9078DF
    A078DFB078DFC               :REM*69
145 DATA 07A958D28D0A958D29*D
    0A958D2AD0A958D2B*D0A9018
    5FB85FCA9888D               :REM*81
146 DATA 00D0A9888D01D0A90085*F
    08D0BD4A900 85F0A944*8516851
    A2 0D411A9988D              :REM*169
147 DATA F80785FFA9018D27D0A9*2
    08D04D4AD1ED0A90885*0A60A90
    185E5A90085E4               :REM*180
148 DATA 60A9208D02D08D06D0A9*F
    88D04D08D08D0A9D88D*09D08D0
    7D0A9408D03D0               :REM*97
149 DATA 8D05D0A90285E285E5A9*0
    185E385E485E685E9A9*0085E78
    5E8202906 0A0               :REM*54
150 DATA 20A2089818 6AA82D15D0*F
    018BD00D02907F00A60*A9 0185E
    7A90285E660BD               :REM*45
151 DATA 01D02907D0EFCACAD0DB*A
    900 6 0A90185E3A90285*E260AD0
    2D02907D007AD               :REM*82
152 DATA 03D02907F0286 04CE70E*A
    90185E9A900 85E860A2*08BD01D
    038E9011875E1               :REM*156
153 DATA 9D01D0CAD0F14C000EA5*F
    A2907F0E660A208BD00*D085DE8
    512BD01D85DF                :REM*177
154 DATA 8513B5E085D8B5E185D9*2
    0E70AA5FA4A4A4AA8B9*1302 90
    0F0B1A900 85DA              :REM*254
155 DATA 85DB85DC85DDA5D8C902*F
    038A5DAD034A517C960*F004C94
    3102AA900 85D8              :REM*186
156 DATA A90185D94CFB0EA5D9C9*0
    2F038A5DCD034A516C9*60F004C
    94310 2AA9085               :REM*218
157 DATA D8A900 85D94CFB0EA5D8*C
    900F0DBA5DBD0D7A519*C960F00
    4C9431 CDA902               :REM*110
158 DATA 85D8A90185D94CFB0EA5*D
    9C900F093A5DDD08FA5*1AC960F
    00 4C9431085A9              :REM*129
159 DATA 0185D8A90285D94CFB0E*4
    C310FBD00D038CD00D0*901AA90
    185DBA900 85DA              :REM*69
160 DATA 4C120FA5D895E0A5D995*E
    1CACAF0DD4C380EA901*85DAA90
    085DBBD01D038               :REM*34
161 DATA CD01D0B00BA90185DCA9*0
    085DD4C2E0FA90185DD*A900 85D
    C4C680EA5F0F0               :REM*186
162 DATA 0160 2CB0DC900F00160*A
    D15D029 2D00DA9208D*02D0A94
    08D03D020F70D               :REM*247
163 DATA AD15D029 4D00DA9F88D*0
    4D0A9408D05D020 80D*AD15D02
    908D00DA9208D               :REM*27
164 DATA 06D0A9D88D07D020E00D*A
    D15D0291 0D00DA9F88D*08D0A9D
    88D09D020120E               :REM*80
165 DATA A91F8D15D0A9108 51A60*A
    5F0F03CC6F1A5F1D002*C6F08D0
    7D4A91F8D08D4               :REM*132
166 DATA A900 8D0CD4A9808D0DD4*A
    9418D0BD4A5F0C9041 0*09A5F1C
    980F00 38D27D0              :REM*242
167 DATA A5F0D00AA9018D27D0A9*0
    08D0BD4A20ABDFECFC9*FFD005A
    91F9DFECFC91E               :REM*167
168 DATA D005A9FE9DFECFCACAD0*E
    7206E0CF03BA6F0D04A*C61FA92
    18D04D4A27FA0               :REM*135
169 DATA 4F8C00D488D0FA8E01D4*A
    0FF88D0FDCAD0ED20DC*0A2 04B1
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Plaque II

PLAQUE MAN

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    1A51FDØ11A2Ø7          :REM*238
17Ø DATA BD1FØØ38DD2FØØDØØ9CA*D
    ØF44CØ7114C2FØE9ØF8*A2Ø7BD1
    FØØ9D2FØØCADØ          :REM*238
171 DATA F74CØ7114D15DØ8D15DØ*F
    8A5ØA182A85ØA186522*8522Ø91
    9A52318691Ø85          :REM*4
172 DATA 239Ø1ØA52418691Ø8524*9
    ØØ7A52518691Ø8525D8*2ØD411A
    9218DØ4D4A914          :REM*224
173 DATA AØ6ØA25FCADØFD8CØ1D4*8
    8DØF518E9Ø1DØEEA92Ø*8DØ4D44
    C2FØEA2Ø7A9ØØ          :REM*199
174 DATA 9D1FØØCADØFAA9Ø3851F*2
    Ø4B11ADØØDC291ØDØF9*A9Ø7854
    4A9ØA85452Ø37          :REM*89
175 DATA ØA4C16Ø82ØØ7Ø1ØDØ52Ø*2
    Ø2Ø2ØØF16Ø5122Ø2Ø2Ø*2Ø1Ø12Ø
    513132Ø2Ø2ØØ6          :REM*27
176 DATA Ø912Ø52Ø2Ø2Ø2ØØ21514*1
    4ØFØE2Ø2Ø2Ø2Ø2Ø2Ø2Ø*2Ø2ØØ8A
    9ØØ8DEE1ØBDBE          :REM*247
177 DATA 1Ø9918Ø7EEEE1ØE8C8A9*Ø
    8CDEE1ØDØEE6ØA9AØ8D*F81ØA9Ø
    68DF91ØA2ØØAØ          :REM*16Ø
178 DATA ØØ2ØEF1ØA2Ø8AØ282ØEF*1
    ØA228AØ5Ø2ØEF1Ø4C29*11A9Ø78
    DF91ØA9188DF8          :REM*56
179 DATA 1ØA21ØAØØØ2ØEF1ØA218*A
    Ø282ØEF1ØA22ØAØ5Ø2Ø*EF1Ø4C9
    81ØA9Ø5A2FFAØ          :REM*135
18Ø DATA FF88DØFDCADØF838E9Ø1*D
    ØF16ØØØØØ183C3C18ØØ*ØØA2Ø7A
    9ØØ9D1FØØ9D2F          :REM*3Ø
181 DATA ØØCADØF7A9Ø3851F2Ø37*Ø
    AADØØDC291ØDØF9A9ØF*8D18D4A
    9218DØ4D4A9FØ          :REM*1Ø2
182 DATA 8DØ6D4A2ØC6Ø6Ø1F6Ø1F*8
    Ø158Ø15F8A52Ø18691Ø*852Ø5Ø2
    EA52118691Ø85          :REM*72
183 DATA 219Ø25A5221869Ø8522*9
    Ø1CA52318691Ø85239Ø*13A5241
    8691Ø85249ØØA          :REM*125
184 DATA A52518691Ø8525ØØ2ØØ*5
    8D8A52529FØ4A4A4A4A*1869Ø8
    DE7Ø4A52429FØ          :REM*35
185 DATA 4A4A4A4A1869Ø8DE8Ø4*A
    52329FØ4A4A4A4A1869*3Ø8DE9Ø
    4A52229FØ4A4A          :REM*217
186 DATA 4A4A18693Ø8DEAØ4A521*2
    9FØ4A4A4A4A18693Ø8D*EBØ4A52
    Ø29FØ4A4A4A4A          :REM*75
187 DATA 18693Ø8DECØ4A9Ø18DE7*D
    88DE8D88DE9D88DEAD8*8DEBD88
    DECD88DEDD8A9          :REM*181
188 DATA 3Ø8DEDØ4ADE7Ø4C93ØDØ*3
    CA96Ø8DE7Ø4ADE8Ø4C9*3ØDØ3ØA
    96Ø8DE8Ø4ADE9          :REM*24Ø
189 DATA Ø4C93ØDØ24A96Ø8DE9Ø4*A
    DEAØ4C93ØDØ18ADEAØ4*C93ØDØ1
    1A96Ø8DEAØ4AD          :REM*18
19Ø DATA EBØ4C93ØDØØ5A96Ø8DEB*Ø
    46ØØØØØØØØØØØØØØØØ*ØØØØ38Ø
    ØØØ7CØØØØFEØØ          :REM*3
191 DATA ØØ92ØØØØFEØØØØ6CØØØØ*F
    EØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*147
192 DATA ØØØØØØØØØØØØØØØØØØØØ*Ø
    ØØØØØØØØØØADØEDC29*FE8DØED
    CA5Ø129FB85Ø1          :REM*53
193 DATA AØØØB9ØØD99ØØ2ØB9ØØ*D
    199ØØ21B9ØØD299ØØ22*B9ØØD39
    9ØØ23B9ØØD499          :REM*228
194 DATA ØØ24B9ØØD599ØØ25C8DØ*D
    9A5Ø1Ø9Ø485Ø1ADØEDC*Ø9Ø18DØ
    EDCAØØØA9FF99          :REM*2Ø8
195 DATA 1822B97Ø2199Ø822B95D*1
    199ØØ22C8CØØ8DØEAAØ*ØØB9881
    299ØØ26B93915          :REM*38
196 DATA 99ØØ27C8CØ4ØDØEF6Ø6Ø*6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6Ø6Ø6Ø6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø           :REM*227
197 DATA 6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*4343434
    3434343434343          :REM*2Ø8
198 DATA 434343434343434343*4
    343434343434343434*6Ø6Ø6Ø6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø           :REM*1Ø8
199 DATA 43416Ø416Ø416Ø416Ø41*6
    Ø416Ø416Ø416Ø416Ø41*6Ø416Ø4
    16Ø416Ø416Ø43          :REM*57
2ØØ DATA 6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*4
    341434143434343434*4341434
    1434341434143          :REM*18
2Ø1 DATA 434343434343414341 43*6
    Ø6Ø13Ø3ØF12Ø56Ø6Ø6Ø*4341434
    Ø6Ø416Ø416Ø41          :REM*2Ø
2Ø2 DATA 6Ø41434143434143416Ø*4
    16Ø416Ø416Ø4Ø434143*6Ø6Ø6Ø6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø           :REM*78
2Ø3 DATA 434143434343434343*4
    343434143434143434*4343434
    3414343414343          :REM*244
2Ø4 DATA 6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*4
    341434341 6Ø416Ø416Ø*416Ø414
    1436Ø6Ø6Ø6Ø6Ø           :REM*16
2Ø5 DATA 6Ø6Ø6Ø6Ø434341434143*4
    341434341434341434 3*4143434
    1434341434341          :REM*241
2Ø6 DATA 434143436Ø6Ø6Ø6Ø6Ø3Ø*3
    Ø6Ø6Ø6Ø434141414143*4341434
    3414343414343          :REM*244
2Ø7 DATA 414343414343414341 41*4
    141414136Ø6Ø6Ø6Ø6Ø6Ø*6Ø6Ø6Ø6
    Ø434143434143          :REM*48
2Ø8 DATA 434143434143414343*4
    143434143434143414341*4343414
    36Ø6Ø6Ø6Ø6Ø6Ø           :REM*178
2Ø9 DATA 6Ø6Ø6Ø6Ø434143434143*4
    341434341434341434 3*4143434
    1434341434341          :REM*249
21Ø DATA 434341436Ø6ØØD5ØE6Ø*6
    Ø6Ø6Ø6Ø434143434 16Ø*416Ø416
    Ø416Ø41414343          :REM*95
211 DATA 41416Ø416Ø416Ø416Ø41*4
    343414136Ø6ØØCØ5Ø614*6Ø6Ø6Ø6
    Ø434143434343          :REM*43
212 DATA 434343434343414343*4
    143434343434343434*4343414
    36Ø6Ø6Ø6Ø6Ø6Ø           :REM*141
213 DATA 6Ø6Ø6Ø6Ø434143 4Ø6Ø41*6
    ØØØØØØØØØØØØØØØØØØ*ØØ7CØØØ
    ØFEØØØØ92ØØØØ          :REM*6Ø
214 DATA FEØØØØC6ØØØØFEØØØØ54*Ø
    ØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*125
215 DATA ØØØØØØØØØØØØØØØØØØØØ*Ø
    ØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*221
216 DATA ØØØØØØØØØØØØØØØØØØØØ*Ø
    ØØØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØ4341          :REM*255
217 DATA 416Ø416Ø416Ø416Ø4143*4
    341436Ø6Ø6Ø6Ø6Ø6Ø6Ø*6Ø6Ø6Ø4
    3414343414343          :REM*125
218 DATA 414343414343414341 41*4
    343414343414343414 3*4341436
    Ø6Ø6Ø6Ø6Ø6Ø6Ø           :REM*139
219 DATA 6Ø6Ø6Ø434141414143 43*4
    143434143434143414341*4343414
    3434143434141          :REM*125
22Ø DATA 414143636Ø6Ø6Ø6Ø6Ø6Ø*6
    Ø6Ø6Ø434341434143 43*4143434
    1434341434341          :REM*185
221 DATA 434341434341434341 43*4
    143436Ø6Ø6Ø6Ø6Ø6Ø6Ø*6Ø6Ø6Ø4
    3434143414343          :REM*212
222 DATA 414343414343414341 41*4
    343414343414343414 3*4143436
    Ø6ØØ8Ø9Ø7Ø86Ø          :REM*155
223 DATA 6Ø6Ø6Ø6Ø414141414343*4
    141414143434 16Ø6Ø41*4343414
    1414143434141          :REM*215
224 DATA 41416Ø6Ø6Ø13Ø3ØF12Ø5*6
    Ø6Ø6Ø434341434143 43*4143434
    1434341434341          :REM*43
225 DATA 434341434341434341 43*4
    143436Ø416Ø416Ø4143*4143434
    143416Ø416Ø41          :REM*1Ø1
226 DATA 6Ø416Ø4Ø434143 6Ø6Ø6Ø*3
    36Ø6Ø6Ø6Ø6Ø6Ø434143*4143434
    3434343434143          :REM*45
227 DATA 414343414341434343*4
    343434143414 36Ø6Ø6Ø*6Ø6Ø6Ø6
    Ø6Ø6Ø6Ø434 16Ø          :REM*124
228 DATA 416Ø416Ø416Ø416Ø416Ø*4
    16Ø416Ø416Ø416Ø416Ø*416Ø416
    Ø416Ø436Ø6Ø6Ø          :REM*147
229 DATA 6Ø6Ø6Ø6Ø6Ø6Ø6Ø434343*4
    343434343434343434*4343434
    3434343434343          :REM*1Ø8
23Ø DATA 434343434343436Ø6Ø6Ø*6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6Ø6Ø6Ø6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø           :REM*16
231 DATA 6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6Ø6Ø6Ø6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø           :REM*164
232 DATA 6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6Ø6Ø6Ø6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø           :REM*165
233 DATA 6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø6Ø*6Ø6Ø6Ø6
    Ø6Ø6Ø6Ø6Ø6Ø6Ø           :REM*166
234 DATA -1                 :REM*88
```

■

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THE ULTIMATE UTILITY / BACKUP CARTRIDGE FOR THE C64/128

NEW!

• Action Replay allows you to Freeze the action of any Memory Resident Program and make a complete back-up to disk - and that's not all ... Just compare these features.

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- Full Monitor Features.
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MORE UNIQUE FEATURES

- Simple Operation: Just press the button at any point and make a complete back-up of any* memory-resident program to tape or disk.
- Turbo Reload: All back-ups reload completely independent of the cartridge at Turbo speed.
- Sprite Monitor: View the Sprite set from the frozen program — save the Sprite — transfer the Sprite from one game to another. Wipe out Sprites, view the animation on screen. Create custom programs.
- Sprite Killer: Effective on most programs — make yourself invincible. Disable Sprite/Sprite/Background collisions.
- Unique Picture Save: Freeze and save any Hires Screen to tape or disk. Saved in Koala, Blazing paddles format.
- Compactor: Efficient compacting techniques — 3 programs per disk — 6 if you use both sides.
- Single File: All programs saved as a single file for maximum compatibility.
- Utility Commands: Many additional commands: Autonum, Append, Old, Delete, Linesaver, etc.
- Screen Dump: Print out any screen in 16 Gray Scales, Double size print options.
- Unstoppable Reset: Reset button to Retrieve System and Reset even so called Unstoppable Programs.
- Fully Compatible: Works with 1541/C/II, 1581, 1571 and with C64, 128, or 128D (in 64 Mode).
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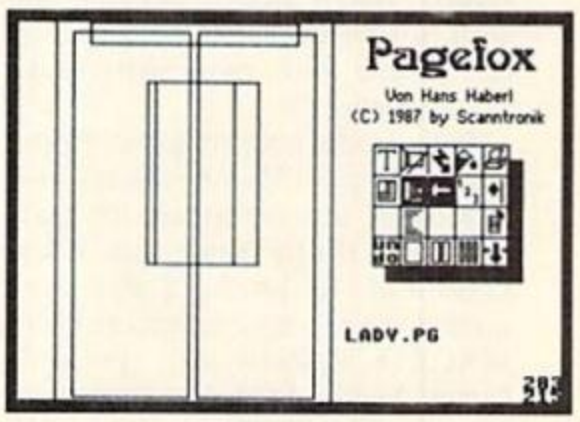

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Macro Mania

Add these macros to your 64, and you'll have Basic commands and functions in a single keystroke.

By STEPHEN DIRSCHAUER

Macro Mania is a short utility that's handy for any C-64 user. Why? Well, even in this age of point-and-click interfaces, typing is still a major part of interacting with a computer, and Macro Mania can save you countless keystrokes. How? By defining 45 macro keys that can be added to your C-64. Each key prints its own macro of up to ten characters.

Macro keys aren't new to the C-64. You can find them in any of the many utilities that let you program your C-64's normally functionless function keys. With the utility in place, hitting a function key automatically prints a Basic command or some other text. If you've used them before, you know they can save you a great deal of time.

However, they aren't perfect. My main gripe is that you're limited to four, or, at most, eight macro keys. Macro Mania provides 45. The other utilities are also useless with a number of programs that use the function keys themselves. Macro Mania doesn't meddle with unshifted function keys, so it's compatible with most programs that utilize them.

Type in the boot program from Listing 1, using *RUN*'s Checksum program to look for any typing errors, and save it to disk. Do the same with Listing 2. Load and run Listing 2 *once* to create on disk the machine language file called MACRO MANIA.ML. To activate Macro Mania, load and run Listing 1. Entering SYS 49699 turns Macro Mania on and off.

Using Macro Mania

You access any of Macro Mania's macros by holding down the Commodore key and a shift key and hitting the appropriate macro key. This may sound like an acrobatic maneuver, but it's really quite simple and quick. Each key will print its own macro only if the Commodore and shift keys are held down. Otherwise, it will act as it normally would.

Although you can program your own macros (I'll show how below), Macro Mania comes with a built-in set, listed in Table 1 along with their corresponding keys. Italics in the table indicate nonprintable characters, listed in a format similar to *RUN*'s program listings. For instance, *5 CRSR DNs* is five presses of the cursor-down key.

Defining Macros

You can define any of the 45 macro keys like this:

```
SYS 50000,"key","macro"
```

For example, to set the P macro to poke, you'd enter:

```
SYS 50000,"P","POKE"
```

Macro Mania doesn't limit you to literal strings like Poke. Any string expression will do, as in these three examples:

```
SYS 50000,A$,"APPLE"
SYS 50000,"K",JT$(5)
SYS 50000,P$,RIGHT$(I$,5)
```

To add the return key to a macro, just add CHR$(13) to its definition. For example:

```
SYS 50000,"L","LIST"+CHR$(13)
```

The L macro would then automatically list the program in memory. You can also put macro definitions in programs.

If you'd like to view a macro's contents, omit the second parameter:

```
SYS 50000,"A"
```

Clear a macro by setting it to a null string:

```
SYS 50000,"C",""
```

Compatibility and More

As a general rule, Macro Mania will work with any program that doesn't disturb memory from 49699 to 50919 ($C223–$C6E7) or change the keyboard vector at 655 ($028F). That in- ►

ILLUSTRATED BY ANN DILLON

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cludes most Basic, and even many machine language, programs. I've used Macro Mania with games, utilities and two machine language word processors. However, the only way to find out if it'll work with a specific program is to experiment.

When you turn Macro Mania on and off with SYS 49699, the current macro set won't be harmed.

Finally, Macro Mania disables the Commodore/shift combination's usual function: toggling between the C-64's two character sets. With Macro Mania in place, you can hold down Commodore and shift and hit the delete key to get the same effect. R

Stephen Dirschauer, an enthusiastic telecommunicator and programmer, enjoys using his C-128 in 64 and 128 modes.

Table 1. Default macro set.

Key	Macro	Key	Macro	Key	Macro
A	AND	P	PRINT	2	LOAD "$",
B	OR	Q	SYS 49749	3	OPEN 4,4 *return*
C	CHR$(	R	RETURN	4	CMD 4 *return*
D	DATA	S	STOP	5	CLOSE 4 *return*
E	CLOSE	T	TO	6	LOAD "*",8:
F	FOR	U	THEN	7	LOAD "$",8:
G	GOTO	V	VERIFY	8	*CRSR RT, DEL*
H	GOSUB	W	WAIT	9	*5 DELs*
I	INPUT	X	RUN	0	LIST: *return*
J	INPUT#	Y	RESTORE	F1	*5 CRSR UPs*
K	READ	Z	GET#	F3	*5 CRSR LFs*
L	LOAD	↑	SYS 50000,"	F5	*5 CRSR RTs*
M	MID$(	@	*undefined*	F7	*5 CRSR DNs*
N	NEXT	*	*undefined*	cursor-down	*undefined*
O	OPEN	1	LOAD "*",	cursor-right	*undefined*

Listing 1. Boot program. (Available on ReRUN disk. See order card facing page 48.)

```
10 REM MACRO MANIA 64 BOOT PROG   20 IF A=0 THEN A=1:LOAD"MACRO M  30 SYS 49699              :REM*31
   RAM                  :REM*239     ANIA.ML",8,1          :REM*3
```

Listing 2. Macro Mania program. (Available on ReRUN disk. See order card facing page 48.)

```
0 REM LISTING 1 CREATES (AND SH
  OULD NOT BE CALLED) MACRO MAN
  IA.ML                 :REM*177
5 OPEN 8,8,8,"MACRO MANIA.ML,P,
  W"                    :REM*170
6 CT=0:PRINT"{SHFT CLR}":REM*56
10 READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                    :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1      :REM*141
15 IF LEN(A$)<62 THEN 55
                        :REM*254
20 B$=MID$(A$,1,20)+MID$(A$,22,
   20)+MID$(A$,43,20)   :REM*242
25 FOR I=1 TO 30        :REM*181
30 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*209
35 H=ASC(H$)-48+7*(H$>"9")
                        :REM*98
40 L=ASC(L$)-48+7*(L$>"9")
                        :REM*197
45 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*67
50 NEXT:GOTO 10         :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 70                 :REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,20)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 70           :REM*176
65 B$=LEFT$(A$,20)+MID$(A$,22,2
   0)+RIGHT$(A$,LEN(A$)-42)
                        :REM*140
70 FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*140
80 H=ASC(H$)-48+7*(H$>"9")
                        :REM*17
85 L=ASC(L$)-48+7*(L$>"9")
                        :REM*232
90 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*148
95 NEXT:GOTO 10         :REM*160
100 REM MACHINE LANGUAGE FOR BI
    GMAC 64             :REM*104
101 DATA 23C2AD64C2D023AE8F02*A
    C90028E90C28C91C2A2*92A0C28
    E8F028C90002A9      :REM*103
102 DATA 808D64C2A965A0C2201E*A
    B60AE90C2AC91C28E8F*028C900
    2A97BA0C2201E       :REM*104
103 DATA ABA9008D64C26000D42*4
    9474D41432036342041*4354495
    6415445442E00       :REM*202
104 DATA 0D4249474D41432036342*2
    044495341424C45442E*000000A
    9808D9102AD8D       :REM*220
105 DATA 02C903F008A9408D22C3*4
    C48EBA5CBC93FD004A9*0D85CBC
    900D011AD22C3       :REM*161
106 DATA C900F00AAD18D049028D*1
    8D0A900A200DD23C3F0*0BE8E02
    DD0F68D22C34C       :REM*88
107 DATA 48EBCD22C3D0034C48EB*A
    924A0C58D05C38C06C3*E000F01
    518AD05C3690A       :REM*251
108 DATA 8D05C3AD06C36900D06*C
    3CA4CE9C2A200BDFFFF*F00B9D7
    702E8E00AF003       :REM*161
109 DATA 4C04C386C6A5CB8D22C3*A
    9405CB4CE0EA000A1C*1412E01
    51A1D2122252A       :REM*201
110 DATA 242726293E110D161E1F*0
    91719C23383B080B10*13181B2
    02E3136040506       :REM*161
111 DATA 03070220FDAE209EAD20*A
    3B6D001608E63C38C64*C3ADFFF
    F8DE6C6C92AD0       :REM*160
112 DATA 05A9254CE3C3C95ED005*A
    9264CE3C3C940D005A9*244CE3C
    3C911D005A92B       :REM*1
113 DATA 4CE3C3C91DD005A92C4C*E
```


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MACRO MANIA

```
    3C3C9859ØØDC9899ØØ3*4CAEC33
    8E95E4CE3C3C9          :REM*1
114 DATA 4Ø9Ø28C95B9Ø1EA9BFAØ*C
    32Ø1EAB2Ø73ØØ2Ø9EAD*2ØA3B66
    ØØD4E4F542Ø41          :REM*95
115 DATA 2Ø4D4143524FØØ38E941*4
    CE3C3C93ØBØØ34CAEC3*C93A9ØØ
    34CAEC338E916          :REM*97
116 DATA A2ØØAAA924AØC58D69C4*8
    C6AC4EØØØFØ1518AD69*C469ØA8
    D69C4AD6AC469          :REM*57
117 DATA ØØ8D6AC4CA4CFØC32Ø79*Ø
    ØC9ØØDØ23AE69C48E1D*C4AC6AC
    48C1EC4ADFFFF          :REM*2Ø7
118 DATA DØØ34C4FC4AE1DC4AC1E*C
    48E66C48C67C44C84C4*2ØFDAE2
    Ø9EAD2ØA3B6DØ          :REM*2Ø5
119 DATA 1CAE69C4AC6AC48E4DC4*8
    C4EC4A9ØØ8DFFFF2ØB2*C4A91CA
    ØC52Ø1EAB6Ø8E          :REM*17Ø
12Ø DATA 66C48C67C48D1BC5A2ØØ*B
    DFFFF9DFFFFFØØ6E8EC*1BC5DØF
    2AD69C48D82C4          :REM*172
121 DATA AD6AC48D83C4A9ØØ9DFF*F
    F2ØB2C4A9222ØD2FFA2*ØØAD66C
    48D9BC4AD67C4          :REM*168
122 DATA 8D9CC4BDFFFFFØØD2ØD2*F
    FE8EØØAFØØ5EC1BC5DØ*EEA9222
    ØD2FF6ØA9ØD2Ø          :REM*165
123 DATA D2FFADE6C6C911FØ34C9*1
    DFØ3AC985BØØ62ØD2FF*4CDEC4A
    9462ØD2FF38AD          :REM*92
124 DATA E6C6E985AABDEEC42ØD2*F
    FA92Ø2ØD2FFA93D2ØD2*FFA92Ø2
    ØD2FF6Ø313335          :REM*82
125 DATA 37A9Ø6AØC52Ø1EAB4CDE*C
    4A91ØAØC52Ø1EAB4CDE*C443525
    3522Ø444F574E          :REM*164
126 DATA ØØ435253522Ø52494748*5
    4ØØØØ28454D5Ø545929*ØØ414E4
    4ØØØØØØØØØØØ          :REM*39
127 DATA ØØ4F52ØØØØØØØØØØØØØØ*Ø
    Ø434852242ØØØØØØØØ*ØØ44415
    441ØØØØØØØØØØ         :REM*133
128 DATA ØØ434C4F5345ØØØØØØØ*Ø
    Ø464F52ØØØØØØØØØØØØ*ØØ474F5
    44FØØØØØØØØØØ         :REM*225
129 DATA ØØ474F53554ØØØØØØØØ*Ø
    Ø494E5Ø5554ØØØØØØØ*ØØ494E5
    Ø555423ØØØØØØ          :REM*215
13Ø DATA ØØ52454144ØØØØØØØØØØ*Ø
    Ø4C4F41442ØØØØØØØØØ*ØØ4D494
    42428ØØØØØØØØ         :REM*96
131 DATA ØØ4E45585ØØØØØØØØØØ*Ø
    Ø4F5Ø454EØØØØØØØØØØ*ØØ5Ø524
    94E54ØØØØØØØØ         :REM*112
132 DATA ØØ5359532Ø3439373439*Ø
    Ø52455455524EØØØØØØ*ØØ53544
    F5ØØØØØØØØØØØ         :REM*112
133 DATA ØØ544FØØØØØØØØØØØØØØ*Ø
    Ø5448454EØØØØØØØØØØ*ØØ56455
    249465ØØØØØØ          :REM*13
134 DATA ØØ5741495ØØØØØØØØØØ*Ø
    Ø52554EØØØØØØØØØØØ*ØØ52455
    3544F5245ØØØØ         :REM*59
135 DATA ØØ47455423ØØØØØØØØØØ*Ø
    Ø4C4953543AØDØØØØØØ*ØØ4C4F4
    144222A222CØØ         :REM*162
136 DATA ØØ4C4F41442224222CØØ*Ø
    Ø4F5Ø454E2Ø342C34ØD*ØØ434D4
    42Ø34ØDØØØØØØ         :REM*143
137 DATA ØØ434C4F53452Ø34ØDØØ*Ø
    Ø4C4F4144222A222C38*3A4C4F4
    1442224222C38          :REM*192
138 DATA 3A1D14ØØØØØØØØØØØØØØ*Ø
    Ø141414141ØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*126
139 DATA ØØØØØØØØØØØØØØØØØØØØ*Ø
    Ø5359533530303032C*2291919
    19191ØØØØØØØ          :REM*164
14Ø DATA ØØ9D9D9D9D9DØØØØØØØØ*Ø
    Ø1D1D1D1D1DØØØØØØØØ*ØØ11111
    11111ØØØØØØØ          :REM*11
141 DATA -1                :REM*252 ■
```


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Machine Language Magic

Now you don't have to hassle with machine code to make use of its speed in your programs.

By BRANDON CORFMAN

It happens to almost every programmer: You get a great idea for a new game or utility on your C-64, but when it comes to writing the code, Basic is just too slow to handle all the routines. You need the speed of machine language, but it takes too much time to learn. If only there were a utility that would supply the machine language for you!

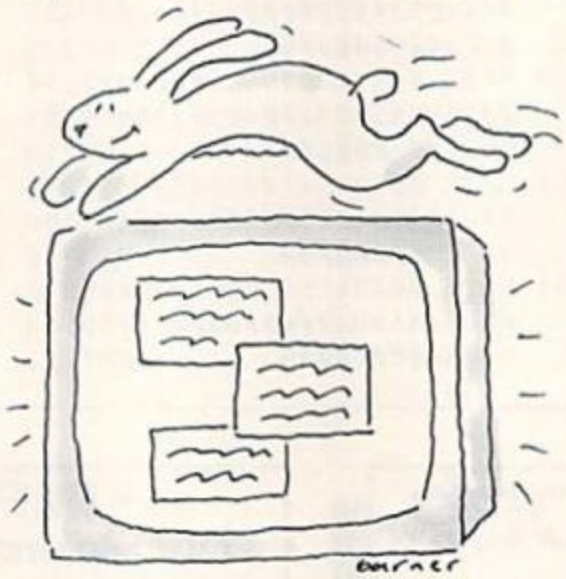
Look no further. Text FX provides all the machine language copying, moving, scrolling and window routines, with resulting special effects, that you need in your Basic programs, leaving you free to develop that ultimate program without worrying about speed.

Text FX is designed to be invisible to Basic. Windows are stored under Basic and Kernal ROM, and the program itself takes no space from Basic RAM. Also, because Text FX uses SYS commands instead of keywords, the routines are as fast as possible.

Listing 1 contains a Basic program that writes the Text FX machine language to disk. Type it in, using *RUN*'s Checksum program to detect errors, save it under the name Text FX Data and run it.

Next, type in the program in Listing 2 and save it under the name Text FX Demo. This program gives you a short demonstration of the capabilities of Text FX, and, I hope, some ideas for using it in your own programs.

The starting memory address of Text FX is 49152 ($C000), and a jump table is located at the beginning of the program for convenience in accessing the routines. Text FX uses addresses $02, $00F8–$00FF, $0334–$033A, $A000–$BFFF and $E000–$FFFF for storage. The TextFill, MultiScroll, WindowSave, WindowRestore and InvertChar commands automatically calculate the current address of screen RAM and adjust their execution accordingly.



Note: At the beginning of a program with window commands, *always* reset the number of windows to zero with POKE 826,0.

WindowInit and WindowFade

WindowInit and WindowFade let you fade any character window to black, so it disappears into a black background. WindowInit, which must be activated first, sets up coordinates for the character window. WindowFade then does the actual step-by-step fading with a program loop. See Listing 3 for a sample routine that uses these commands.

Activate WindowInit with

```
SYS SA,X1,Y1,X2,Y2
```

where SA is the starting address of Text FX, X1 and Y1 are the X and Y coordinates of the top-left corner of the window, and X2 and Y2 are the bottom-right coordinates.

Activate WindowFade with

```
SYS SA+3
```

No parameters are needed here, but a loop is required to make the screen fade in steps. I designed WindowFade with a loop, so you can regulate the speed of the fade. Simply insert a delay between the SYS statement and the If statement in line number 40 of Listing 3.

When the screen is completely black, WindowFade tells your program by storing 1 in address 2. The loop will be broken, and your program will go on to the next line.

FadeInit and FadeScreen

This pair of commands fades the entire screen, including the background and border, to black. FadeInit must be activated before FadeScreen for your program to work correctly.

Activate FadeInit with

```
SYS SA+6
```

No parameters are needed, since FadeInit involves the entire screen, not just a window.

Activate FadeScreen with

```
SYS SA+9
```

No parameters are needed here, either, but a loop similar to the one in WindowFade is required. Here again, you can put a delay in the loop if needed. FadeScreen operates much like WindowFade, except for affecting the entire screen.

ColorFill and TextFill

As the name implies, ColorFill fills any portion of color RAM with the color you specify. It's much faster—and more versatile—than using Pokes from Basic. ColorFill should be activated prior to TextFill, especially on old C-64s where Pokes to screen RAM are invisible. A sample routine that uses these commands appears in Listing 4.

Activate ColorFill with

```
SYS SA+12,X1,Y1,X2,Y2,COLOR
```

where X1, Y1, X2 and Y2 are the window coordinates, and COLOR is the ►

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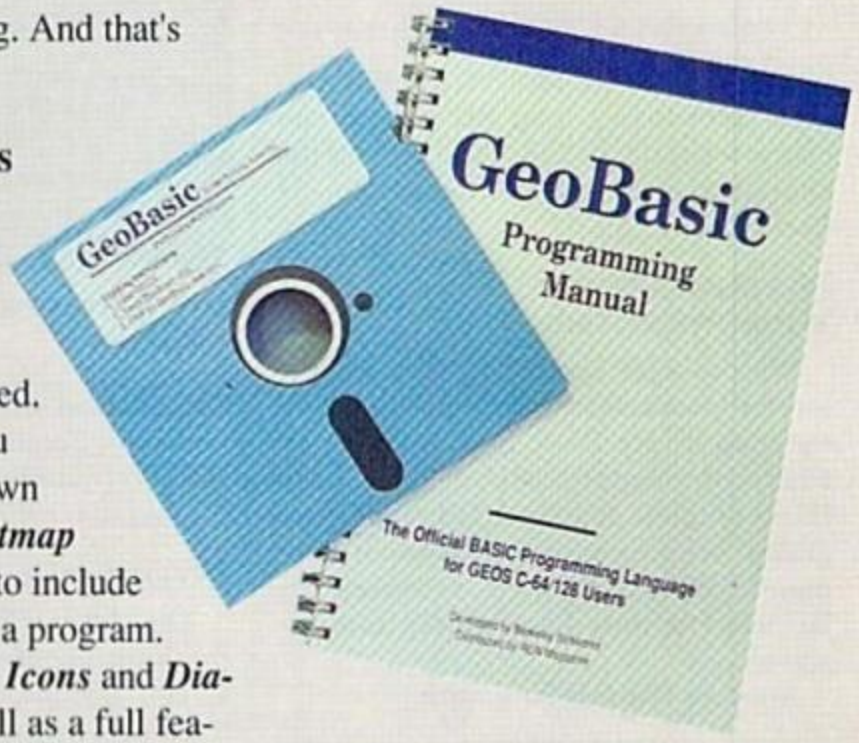

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number, 0–15, of the Commodore color to put in color RAM.

TextFill has two main purposes: to clear portions of the screen used for windows and to provide borders for windows. Activate it with

SYS SA+15,X1,Y1,X2,Y2,SC

where X1, Y1, X2 and Y2 are the window coordinates, and SC is a screen character code, 0–255. You can find the character codes in the *Commodore 64 User's Guide*.

WindowSave and WindowRestore

WindowSave saves any portion of the screen (characters and their colors) to the area under Basic or Kernal ROM, where no memory can be stolen from Basic or most machine language programs. WindowSave's companion command, WindowRestore, retrieves the last window stored and places it on the screen.

Activate WindowSave with

SYS SA+18,X1,Y1,X2,Y2

where X1, Y1, X2 and Y2 are the window coordinates. Up to eight windows can be active at once.

Activate WindowRestore with

SYS SA+21

This command needs no parameters.

ScrollInit and MultiScroll

These commands are used together to scroll all or part of the screen in any direction. ScrollInit is the set-up routine, while MultiScroll does the actual scrolling.

Activate ScrollInit with

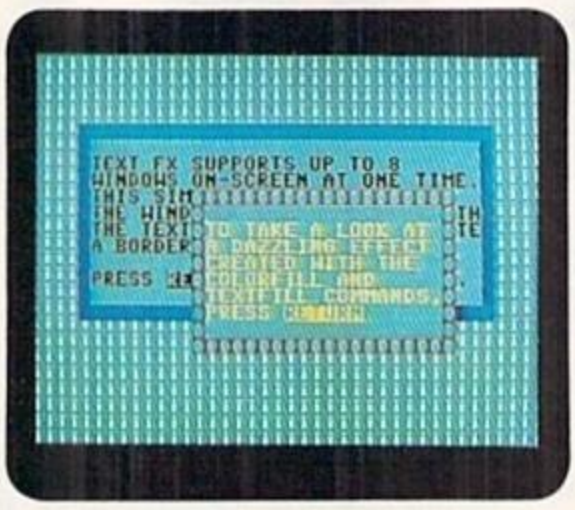
SYS SA+24,D,B1,B2

where D is the direction you want the screen to move, and B1 and B2 are the X or Y boundaries of the area that moves. The possible direction values are 1 for up, 2 for right, 3 for down and 4 for left. When scrolling up or down, B1 and B2 are X coordinates in the range 0–39; when scrolling right or left, B1 and B2 are Y coordinates in the range 0–24.

Activate MultiScroll with

SYS SA+27

This command needs no parameters.



Text FX lets you create fantastic screen effects.

Once you've set a direction and boundaries with ScrollInit, you can use MultiScroll repeatedly until another Text FX command is executed.

InvertChar

The InvertChar command toggles the high bit of screen memory in the screen window you specify, inverting the video in the window. This is especially handy for highlighting menu options and flashing part of the screen. Activate InvertChar with

SYS SA+30,X1,Y1,X2,Y2

where X1, Y1, X2 and Y2 are the window coordinates.

MemFill

MemFill is a general-purpose command for clearing a hi-res screen or erasing a section of memory. Activate MemFill with

SYS SA+33,ADDRESS 1,ADDRESS 2,VALUE

where ADDRESS 1 and ADDRESS 2 are the beginning and ending addresses for the fill operation, and VALUE is the number of the character to insert.

MemCopy

Copying memory at machine language speed is easy with MemCopy. Try using this command to copy character sets or hi-res screens, or, with MultiScroll, to scroll screens for an arcade game. Activate MemCopy with

SYS SA+36,ADDRESS 1,ADDRESS 2,DESTINATION START

where ADDRESS 1 and ADDRESS 2 are the beginning and ending addresses of the memory area you're copying from, and DESTINATION START is the beginning address of the memory area you're copying to.

Designer's Notes

I certainly liked the effect of the fade routines when I wrote them, but after a while, I began to wish for fade-ins, too. At first, I thought the mechanics of doing a fade-in would be beyond my ability and patience, but when I started thinking about how to use the window routines in programs, it came to me. While the screen is blanked, you can save each step of a fade-out as a window, then flip the screen back on and resurrect the text in a few easy steps. And, this takes only a few seconds! To turn off the screen, use POKE 53265, PEEK (53265) AND 239; to turn it back on, use POKE 53265, PEEK (53265) OR 16.

Text FX doesn't provide for restoring windows in a different order and at different locations, but it can be done—at your own risk and with your own error checking. Here's how:

Address 826 ($033A) is used by Text FX to hold the number of the window currently open. This number increases or decreases accordingly each time a window is opened or closed. To change the window order, change the value in this address to the number of the window you want.

The X and Y values specified in each WindowSave command are stored as the first four bytes of the window's data with the starting memory addresses of the eight windows at $A000, $A800, $B000, $B800, $E000, $E800, $F000 and $F800. Changing these X and Y values changes the location on the screen where WindowRestore places the window. There's only one problem: WindowRestore doesn't check to see if the data it resurrects is off screen, so you could end up overwriting your Basic program.

Text FX will make a world of difference in your programming capability. Its ready-made machine language routines will free you to do the creative programming you want to do. Ⓡ

Brandon Corfman enjoys designing utilities and has been programming on Commodore machines for six years.

Listing 1. Text FX Data program. (Available on ReRUN disk. See order card facing page 48.)

```
0 REM THIS LIST 1 CREATES (AND
  SHOULD NOT BE CALLED) TEXT FX
  .ML                    :REM*223
5 OPEN 8,8,8,"TEXT FX.ML,P,W"
                         :REM*156
6 CT=0:PRINT"{SHFT CLR}":REM*56
10 READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                     :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1       :REM*141
15 IF LEN(A$)<62 THEN 55
```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```
                              :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
   2Ø)+MID$(A$,43,2Ø)         :REM*242
25 FOR I=1 TO 3Ø              :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                              :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55                  :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55                  :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                              :REM*67
5Ø NEXT:GOTO 1Ø               :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 7Ø                       :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
   A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 7Ø                 :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
   Ø)+RIGHT$(A$,LEN(A$)-42)
                              :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                              :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55                  :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55                  :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                              :REM*148
95 NEXT:GOTO 1Ø               :REM*16Ø
1ØØ REM HEX DATA FOR TEXT FX 64
                              :REM*2Ø1
1Ø1 DATA ØØC Ø4C27C Ø4C46C Ø4CFE*C
    Ø4C Ø6C14C4FC14C92C1*4C2DC24
    C98C24C5AC34C             :REM*56
1Ø2 DATA 93C34C8 ØC54CB4C54CFC*C
    52ØFEC Ø2Ø C9C12ØFFC1*18AD35Ø
    36D34Ø385F88D             :REM*249
1Ø3 DATA 34Ø3A5F969D885F98D35*Ø
    36ØA2ØØAØØØ2Ø85C ØC8*CC36Ø3F
    ØØ34C4AC ØE8EC            :REM*115
1Ø4 DATA 37Ø3FØ1Ø18A5F8692885*F
    8A5F969ØØ85F94C48C Ø*EE3BØ3A
    D3BØ3C9Ø4DØØ4             :REM*6
1Ø5 DATA A9Ø185Ø2AD34Ø385F8AD*3
    5Ø385F96ØB1F829ØFF Ø*F9C9Ø1F
    Ø3DC9Ø2FØ3EC9             :REM*137
1Ø6 DATA Ø3FØ3FC9Ø4FØ59C9Ø5FØ*2
    8C9Ø6FØ24C9Ø7FØ34C9*Ø8FØ35C
    9Ø9FØ18C9ØAFØ             :REM*9
1Ø7 DATA 32C9ØBFØ1ØC9ØCFØ2FC9*Ø
    DFØ3ØC9ØEFØ31C9ØFFØ*32A9ØØ9
    1F86ØA9ØF91F8             :REM*126
1Ø8 DATA 6ØA9Ø991F86ØA9ØE91F8*6
    ØA9Ø891F86ØA9Ø991F8*6ØA9Ø29
    1F86ØA9ØB91F8             :REM*62
1Ø9 DATA 6ØA9Ø591F86ØA9Ø691F8*6
    ØA9ØC91F86ØA9ØØ8D3B*Ø385Ø26
    ØAØØØA92Ø85F8             :REM*136
11Ø DATA A9DØ85F9A2ØØ2Ø85C ØE6*F
    8E8EØØ4DØF6A9ØØ85F8*A9D885F
    92Ø85C ØE6F8DØ            :REM*7Ø
111 DATA Ø2E6F9A5F8C9E8FØØ34C*2
    4C1A5F9C9DBFØØ34C24*C1EE3BØ
    3AD3BØ3C9Ø4FØ             :REM*113
112 DATA Ø16ØA9Ø185Ø26ØD82ØC9*C
    12Ø9BB786FA2ØFFC118*AD35Ø36
    D34Ø385F8A5F9             :REM*173
113 DATA 69D885F9A2ØØAØØØA5FA*9
    1F8C8CC36Ø3FØØ34C7Ø*C1E8EC3
    7Ø3FØ1Ø18A5F8             :REM*37
114 DATA 692885F8A5F969ØØ85F9*4
    C6CC16ØD82ØC9C12Ø9B*B786FA2
    ØFFC12Ø46C3A2             :REM*182
115 DATA ØØAØØØA5FA91F8C8CC36*Ø
    3FØØ34CA7C1E8EC37Ø3*FØ1Ø18A
    5F8692885F8A5             :REM*87
116 DATA F969ØØ85F94CA3C16Ø2Ø*9
    BB7EØ28BØ2C8E34Ø32Ø*9BB7EØ1
    9BØ228E35Ø32Ø             :REM*117
117 DATA 9BB7EØ28BØ18EC34Ø39Ø*1
    38E36Ø32Ø9BB7EØ19BØ*Ø9EC35Ø
    39ØØ48E37Ø36Ø             :REM*216
118 DATA 4CØ8AF38AD36Ø3ED34Ø3*1
    869Ø18D36Ø338AD37Ø3*ED35Ø31
    869Ø18D37Ø318             :REM*221
119 DATA A9ØØA2Ø86A6E35Ø39ØØ3*1
    86928CA1ØF485F96ØD8*AD3AØ3C
    9Ø89ØØ34CFCC1             :REM*167
12Ø DATA 2ØC9C12ØØCC3AØØØB934*Ø
    391FAC8CØØ4DØF6EE3A*Ø32Ø39C
    3A2ØØ2Ø64C2AD             :REM*63
121 DATA 38Ø385F818AD39Ø369D8*8
    5F9A2ØØAØØØ8C34Ø3B1*F8AØØØ9
    1FAAC34Ø3E6FA             :REM*4
122 DATA DØØ2E6FBC8CC36Ø3FØØ3*4
    C66C2E8EC37Ø3FØ1Ø18*A5F8692
    885F8A5F969ØØ             :REM*123
123 DATA 85F94C64C26ØD8AD3AØ3*D
    ØØ34CØ8AFCE3AØ32ØØC*C378A93
    585Ø1AØØØB1FA             :REM*192
124 DATA 9934Ø3C8CØØ4DØF62Ø39*C
    3A2ØØ2ØD8C2AD38Ø385*F818AD3
    9Ø369D885F9A2             :REM*164
125 DATA ØØ2ØD8C2A93785Ø1586Ø*A
    ØØØ8C34Ø3AØØØB1FAAC*34Ø391F
    8E6FADØØ2E6FB             :REM*226
126 DATA C8CC36Ø3FØØ34CDAC2E8*E
    C37Ø3FØ1Ø18A5F86928*85F8A5F
    969ØØ85F94CD8             :REM*166
127 DATA C26ØA9ØØ85FAAØØ8AD3A*Ø
    3186D3AØ388CØØØDØF7*85FBAD3
    AØ3C9Ø4BØØA18             :REM*1Ø5
128 DATA A5FB69AØ85FB4C38C318*A
    5FB69CØ85FB6Ø18A5FA*69Ø485F
    A2ØFFC18D39Ø3             :REM*59
129 DATA 18AD35Ø36D34Ø385F88D*3
    8Ø3AD88Ø265F985F96Ø*2Ø9BB7E
    ØØØFØ51EØØ5BØ             :REM*249
13Ø DATA 4D8AA88C36Ø32Ø9BB72Ø*8
    2C38E34Ø32Ø9BB72Ø82*C3EC34Ø
    39Ø348E35Ø36Ø             :REM*51
131 DATA AC36Ø3CØØ3BØØ5EØ28BØ*2
    56ØE Ø19BØ2Ø6ØAE36Ø3*EØØ1FØØ
    CEØØ2FØØBEØØ3             :REM*56
132 DATA FØØAEØØ4FØØ94CB5C34C*3
    2C44CB2C44C3DC54CØ8*AFAD88Ø
    285F985FBA9ØØ             :REM*253
133 DATA 85FA85FEA92885F885FC*A
    9D885FD85FFA9CØ8D38*Ø3A9DB8
    D39Ø3AC34Ø3B1             :REM*172
134 DATA F891FAB1FC91FECC35Ø3*F
    ØØ4C84CDBC318A5F869*2885F8A
    5F969ØØ85F918             :REM*254
135 DATA A5FA692885FAA5FB69ØØ*8
    5FB18A5FC692885FCA5*FD69ØØ8
    5FD18A5FE6928             :REM*29
136 DATA 85FEA5FF69ØØ85FFA5FE*C
    D38Ø3DØØ7A5FFCD39Ø3*FØØ34CD
    8C36Ø18AD88Ø2             :REM*137
137 DATA 69Ø385F985FBA9CØ85FA*8
    5FEA99885F885FCA9DB*85FD85F
    FA9ØØ8D38Ø3A9             :REM*5
138 DATA D88D39Ø3AC34Ø3B1F891*F
    AB1FC91FECC35Ø3FØØ4*C84C5BC
    438A5F8E92885             :REM*221
139 DATA F8A5F9E9ØØ85F938A5FA*E
    92885FAA5FBE9ØØ85FB*38A5FCE
    92885FCA5FDE9             :REM*23Ø
14Ø DATA ØØ85FD38A5FEE92885FE*A
    5FFE9ØØ85FFA5FECD38*Ø3DØØ7A
    5FFCD39Ø3FØØ3             :REM*215
141 DATA 4C58C46Ø2ØF7C4AØØØC8*B
    1F88891F8C8B1FA8891*FAC8CØ2
    7FØØ34CB7C4A5             :REM*13Ø
142 DATA FACD38Ø3DØØ8A5FBCD39*Ø
    3DØØ16Ø18A5F8692885*F8A5F96
    9ØØ85F918A5FA             :REM*34
143 DATA 692885FAA5FB69ØØ85FB*4
    CB5C4AD34Ø385FC2Ø2A*C5A5FC8
    5F885FA18A5FD             :REM*24Ø
144 DATA 6D88Ø285F918A5FD69D8*8
    5FBAD35Ø385FC2Ø2AC5*A5FC8D3
    8Ø318A5FD69D8             :REM*151
145 DATA 8D39Ø36Ø18A9ØØA2Ø86A*6
    6FC9ØØ3186928CA1ØF5*85FD6Ø2
    ØF7C4AØ2788B1             :REM*48
146 DATA F8C891F888B1FAC891FA*8
    8FØØ34C42C5A5FACD38*Ø3DØØ8A
    5FBCD39Ø3DØØ1             :REM*153
147 DATA 6Ø18A5F8692885F8A5F9*6
    9ØØ85F918A5FA692885*FAA5FB6
    9ØØ85FB4C4ØC5             :REM*156
148 DATA D82ØC9C12ØFFC12Ø46C3*A
    2ØØAØØØB1F8498Ø91F8*C8CC36Ø
    3FØØ34C8EC5E8             :REM*221
149 DATA EC37Ø3FØ1Ø18A5F86928*8
    5F8A5F969ØØ85F94C8C*C56Ø2ØF
    DAE2Ø8AAD2ØF7             :REM*2Ø4
15Ø DATA B784F885F92ØFDAE2Ø8A*A
    D2ØF7B784FA85FBC5F9*FØØ5BØØ
    94C48B2A5FAC5             :REM*155
151 DATA F89ØF72Ø9BB7AØØØ8A91*F
    8AAA5FAC5F8DØØ7A5FB*C5F9DØØ
    16ØE6F8DØØ2E6             :REM*85
152 DATA F94CE2C52ØFDAE2Ø8AAD*2
    ØF7B78C34Ø38D35Ø32Ø*FDAE2Ø8
    AAD2ØF7B78C36             :REM*11
153 DATA Ø38D37Ø32ØFDAE2Ø8AAD*2
    ØF7B784FA85FBAD37Ø3*CD35Ø3F
    ØØ5BØØB4CD4C5             :REM*8
154 DATA AD36Ø3CD34Ø39ØF5AD35*Ø
    3C5FBFØ56BØ5D38AD36*Ø3ED34Ø
    38D38Ø3AD37Ø3             :REM*86
155 DATA ED35Ø38D39Ø318AD38Ø3*6
    5FA85FAAD39Ø365FB85*FBAD36Ø
    385F8AD37Ø385             :REM*228
156 DATA F9AØØØB1F891FAA5F8CD*3
    4Ø3DØØ8A5F9CD35Ø3DØ*Ø16ØA5F
    8DØØ2C6F9C6F8             :REM*82
157 DATA A5FADØØ2C6FBC6FA4C73*C
```

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```
    6AD34Ø3C5FA9ØA5FØE3*AD34Ø38
    5F8AD35Ø385F9        :REM*14
158 DATA AØØØB1F891FAA5F8CD36*Ø
    3DØØ8A5F9CD37Ø3DØØ1*6ØE6F8D
    ØØ2E6F9E6FADØ        :REM*212
159 DATA Ø2E6FB4CAEC6    :REM*29
16Ø DATA -1                  :REM*18
```

Listing 2. Text FX Demo program. (Available on ReRUN disk. See order card facing page 48.)

```
1Ø IF PEEK(49152)=76 AND PEEK(4
   9153)=39 THEN 3Ø      :REM*36
2Ø LOAD"TEXT FX.ML",8,1:REM*2Ø3
3Ø POKE5328Ø,6:POKE53281,12:DIM
   A$(15):POKE826,Ø:GOSUB54Ø
                         :REM*167
4Ø SA=49152:WI=SA:WF=SA+3:FI=SA
   +6:FS=SA+9:CF=SA+12:TF=SA+15
   :WS=SA+18:WR=SA+21   :REM*149
5Ø SI=SA+24:MS=SA+27:IC=SA+3Ø
                         :REM*5Ø
6Ø PRINT "{SHFT CLR}{CRSR DN}{C
   TRL 8}RUN MAGAZINE PRESENTS
   ..."                  :REM*196
7Ø PRINT"{5 CRSR DNs}"SPC(14)"{
   CTRL 2}TEXT FX DEMO" :REM*29
8Ø PRINTSPC(19)"{CRSR DN}{CTRL
   1}BY"                 :REM*111
9Ø PRINTSPC(13)"{CRSR DN}{CTRL
   7}BRANDON CORFMAN"   :REM*211
1ØØ PRINTSPC(8)"{6 CRSR DNs}{CO
    MD 4}PRESS {CTRL 9}RETURN{C
    TRL Ø} TO CONTINUE" :REM*17
11Ø GETZ$:IFZ$<>CHR$(13)THEN11Ø
                         :REM*232
12Ø SYSFI:FORT=1TO1ØØØ:NEXT
                         :REM*167
13Ø SYSFS:IFPEEK(2)=.THEN13Ø
                         :REM*229
14Ø FORI=1TO1ØØØ:NEXT    :REM*56
15Ø PRINT "{SHFT CLR}{8 CRSR DN
    s}{CTRL 1}"SPC(7)"YOU JUST
    SAW AN EXAMPLE OF"   :REM*Ø
16Ø PRINTSPC(6)"TEXT FX'S FADES
    CREEN COMMAND."      :REM*46
17Ø PRINTSPC(6)"{3 CRSR DNs}NOW
     HIT {CTRL 9}RETURN{CTRL Ø}
     FOR A LOOK AT"      :REM*68
18Ø PRINTSPC(8)"ITS WINDOW CAPA
    BILITIES."           :REM*146
19Ø SYSCF,Ø,Ø,39,24,11:SYSCF,Ø,
    Ø,39,24,12:SYSCF,Ø,Ø,39,24,
    15:SYSCF,Ø,Ø,39,24,1
                         :REM*166
2ØØ GETZ$:IFZ$<>CHR$(13)THEN2ØØ
                         :REM*16
21Ø SYSCF,Ø,Ø,39,24,15:SYSCF,Ø,
    Ø,39,24,12:SYSCF,Ø,Ø,39,24,
    11:SYSCF,Ø,Ø,39,24,Ø
                         :REM*111
22Ø PRINT"{SHFT CLR}":FORI=1TO1
    ØØØ:NEXT             :REM*239
23Ø POKE5328Ø,11:POKE53281,12:S
    YSCF,Ø,Ø,39,24,1:SYSTF,Ø,Ø,
    39,24,33             :REM*31
24Ø SYSWS,4,5,35,16:SYSCF,4,5,3
    5,16,6:SYSTF,4,5,35,16,16Ø:
    SYSTF,5,6,34,15,32 :REM*185
25Ø PRINT"{HOME}{CTRL 1}{7 CRSR
     DNs}"SPC(5)"TEXT FX SUPPOR
    TS UP TO 8"          :REM*136
26Ø PRINTSPC(5)"WINDOWS ON-SCRE
    EN AT ONE TIME."     :REM*183
27Ø PRINTSPC(5)"THIS SIMPLE EXA
    MPLE UTILIZES"       :REM*69
28Ø PRINTSPC(5)"THE WINDOW COMM
    ANDS ALONG WITH"     :REM*228
29Ø PRINTSPC(5)"THE TEXTFILL CO
    MMAND TO CREATE"     :REM*242
3ØØ PRINTSPC(5)"A BORDER FOR TH
    E WINDOW."           :REM*196
31Ø PRINTSPC(5)"{CRSR DN}PRESS
    {CTRL 9}RETURN{CTRL Ø} NOW
    TO CONTINUE."        :REM*2Ø
32Ø GETZ$:IFZ$<>CHR$(13)THEN32Ø
                         :REM*234
33Ø SYSWS,13,9,32,18:SYSCF,13,9
    ,32,18,2:SYSTF,13,9,32,18,2
    Ø9                   :REM*2Ø2
34Ø SYSTF,14,1Ø,31,17,32
                         :REM*15Ø
35Ø PRINT"{HOME}{11 CRSR DNs}"S
    PC(14)"{CTRL 8}TO TAKE A LO
    OK AT"               :REM*23
36Ø PRINTSPC(14)"A DAZZLING EFF
    ECT"                 :REM*245
37Ø PRINTSPC(14)"CREATED WITH T
    HE"                  :REM*155
38Ø PRINTSPC(14)"COLORFILL AND"
                         :REM*59
39Ø PRINTSPC(14)"TEXTFILL COMMA
    NDS,"                :REM*Ø
4ØØ PRINTSPC(14)"PRESS {CTRL 9}
    RETURN{CTRL Ø}"      :REM*71
41Ø GETZ$:IFZ$<>CHR$(13)THEN41Ø
                         :REM*22
42Ø SYSWR:FORI=1TO1ØØØ:NEXT:SYS
    WR:FORI=1TO1ØØØ:NEXT
                         :REM*146
43Ø FORI=ØTO12:SYSTF,12-I,12-I.
    27+I,12+I,16Ø:SYSCF,12-I,12
    -I,27+I,12+I,3:NEXT:REM*237
44Ø POKE53281,Ø:POKE5328Ø,Ø
                         :REM*37
45Ø FORI=ØTO12:SYSTF,12-I,12-I,
    27+I,12+I,32:SYSCF,12-I,12-
    I,27+I,12+I,Ø:NEXT :REM*255
46Ø SYSSI,2,Ø,39         :REM*95
47Ø SYSMS:Z=Z+1:PRINT"{HOME}"A$
    (Z);:IFZ<15THEN47Ø :REM*186
48Ø GETZ$:IFZ$=""THEN 48Ø
                         :REM*162
49Ø IFZ$="{FUNCT 1}"THEN 53Ø:
                         :REM*246
5ØØ SYSWI,Ø,1Ø,39,14     :REM*234
51Ø SYSWF:FORI=ØTO1Ø:NEXT:IFPEE
    K(2)=ØTHEN51Ø        :REM*227
52Ø CLR: GOTO 3Ø         :REM*1Ø5
53Ø END                  :REM*144
54Ø FORI=6TO15:A$(I)="{4Ø SPACE
    s}":NEXT             :REM*171
55Ø A$(1)="{CTRL 4}{CRSR DN}PRE
    SS A KEY TO RUN AGAIN OR {C
    TRL 9}F1{CTRL Ø} TO END"
                         :REM*175
56Ø A$(2)="{4Ø SPACEs}" :REM*89
57Ø A$(3)="PROGRAMMING - AND MA
    KES IT MORE FUN TOO!"
                         :REM*88
58Ø A$(4)="{CTRL 8}TEXT FX{CTRL
     4} SPEEDS UP YOUR BASIC{12
     SPACEs}"            :REM*218
59Ø A$(5)="FROM SCREEN SCROLLIN
    G TO COPYING DATA,":REM*223
6ØØ RETURN               :REM*228
```

Listing 3. Sample routine for using WindowInit and WindowFade. (Available on ReRUN disk. See order card facing page 48.)

```
1Ø IF A=Ø THEN A=1:LOAD "TEXT F
   X.ML",8,1:REM LOAD TEXT FX
                         :REM*166
2Ø SA=49152:REM STARTING ADDRES
   S OF TEXT FX          :REM*212
3Ø SYS SA,1Ø,1Ø,2Ø,2Ø:REM SET U
   P THE FADE WITH WINDOWINIT
                         :REM*5
4Ø SYS SA+3:IF PEEK(2)=Ø THEN 4
   Ø:REM LOOP FOR WINDOWFADE
                         :REM*214
```

Listing 4. Sample routine for using ColorFill and TextFill. (Available on ReRUN disk. See order card facing page 48.)

```
1Ø IF A=Ø THEN A=1:LOAD "TEXT F
   X.ML",8,1:REM LOAD TEXT FX
                         :REM*166
2Ø POKE 826,Ø:REM ALWAYS, ALWAY
   S USE THIS POKE BEFORE USING
    WINDOW COMMANDS!     :REM*4Ø
3Ø SA=49152:CF=SA+12:TF=SA+15:W
   S=SA+18:REM DEFINE VARIABLES
                         :REM*94
4Ø SYS WS,1Ø,1Ø,2Ø,2Ø:REM SAVE
   A WINDOW              :REM*59
5Ø SYS CF,1Ø,1Ø,2Ø,2Ø,1:REM FIL
   L THE WINDOW WITH THE COLOR
   WHITE                 :REM*25
6Ø SYS TF,1Ø,1Ø,2Ø,2Ø,16Ø:REM F
   ILL THE WINDOW WITH REVERSED
    SPACES               :REM*129
7Ø SYS TF,11,11,19,19,32:REM CL
   EAR A SMALLER WINDOW INSIDE
   THE LARGER ONE        :REM*191
```

■

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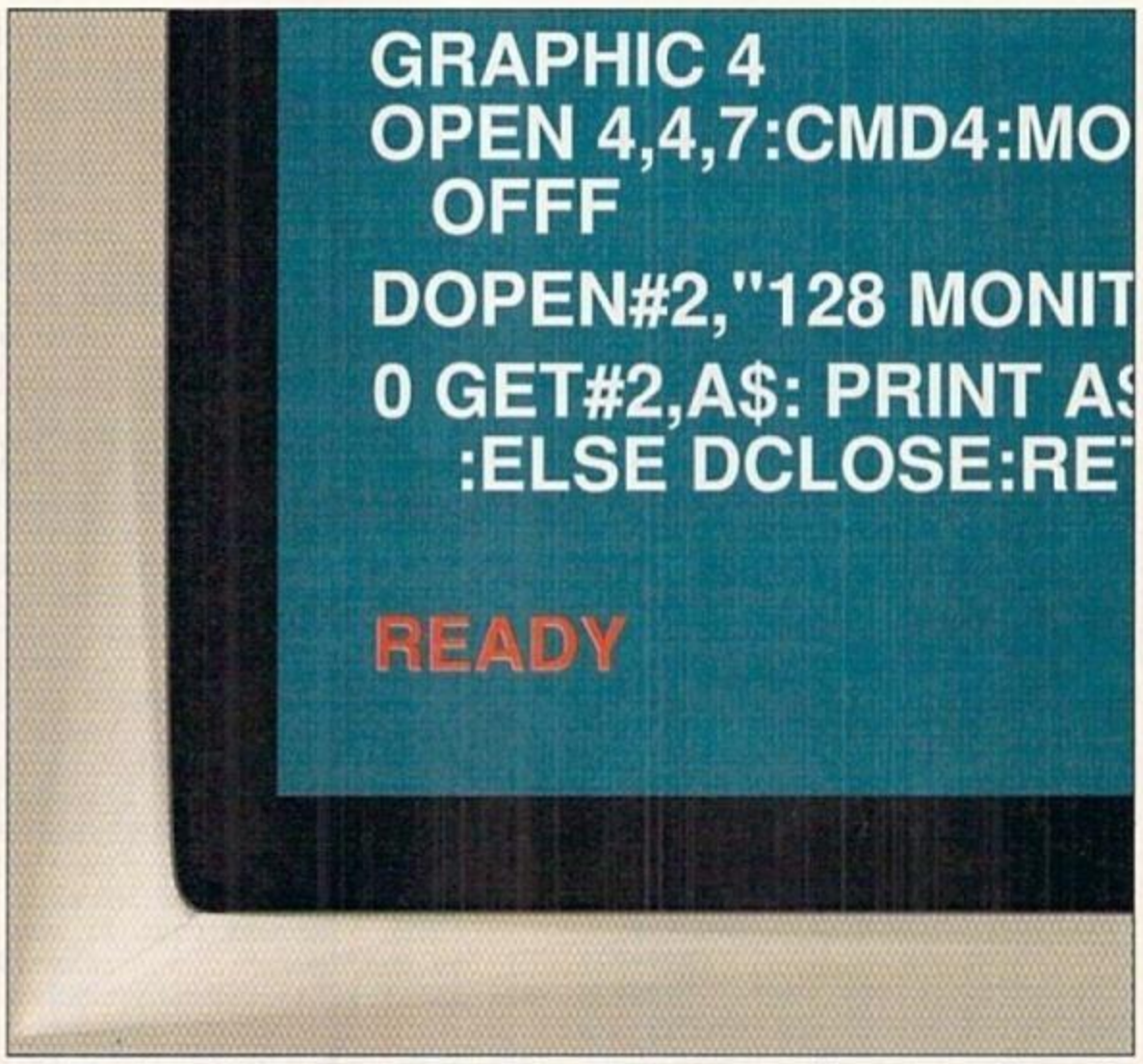
128 Mode

This month we direct our attention to handy uses for Direct mode.

By MARK JORDAN



ACCORDING TO the official Commodore literature, Direct mode is "the mode of operation that executes Basic commands immediately after the return key is pressed." For example, DLoad and Run are Direct mode operations. You can't, as they say, miss it, but you certainly can miss using Direct mode to its fullest potential.

Almost the entire Basic vocabulary works in Direct mode, and the rules for using Direct mode are quite simple:

1. You can stack commands as long as they're separated with a colon.
2. You must have your cursor on the line to be executed.
3. You must press the return key to start execution.

Program Debugging

Direct mode commands can be executed with or without a program in memory. When one is resident, Direct mode lets you check or change variables, read values in Data statements, jump in and out of Program mode, and more. Jumping from one mode to the other is especially handy. Both GoTo and GoSub can get you from Direct mode to Program mode, but GoSub offers the further advantage of shipping you back.

A reversal of this process can be forced by using the Stop and Cont commands. When the computer encounters the Stop command within a program, it halts Program mode and kicks in Direct mode. There, you can do work like checking variables, and, when you're done, head back into the program with Cont.

I employed these commands in the Horseshoes game that appeared in the August/September issue of *RUN*. To test for the location of a toss, I inserted GRAPHIC 0:STOP in the program immediately after the toss landed. This transported me to the text screen in Direct mode where I could type PRINT RSPPOS(1,0) to see exactly which pixel the horseshoe sprite landed on.

Graphics Design

Direct mode's strength is especially evident in designing graphics screens for use in a Basic program. This is normally tricky and slow, because you can't see what a graphic will look like until you run the program. Direct mode offers three clever ways to view your work as you create it.

The first method is to place the computer in Split Screen mode with GRAPHIC 2 (or 4, for multicolor). If you're designing a graphic that will occupy half a screen or less, set the split at about line 12 (GRAPHIC 2,1,12). Then move your cursor down until it appears in the text area, press escape followed by T, and you'll have defined the bottom half of the screen as a text window. Once that's done, it's a simple matter to type any graphics commands you want to try, press return, and watch the commands execute in the top half of the screen. (Just remember to locate them in the top.) When you've got your circles and lines the way you want, insert a line number in front of each graphics command, and it becomes a permanent part of your program.

In the second method, if you want to fill the bottom half or all of the screen with graphics, you'll need a different technique: the old screen switcheroo. Type your graphics commands on the 80-column screen, then switch your monitor to 40-Column mode to observe the results. You don't even need to enter ESC X to go back and forth, since the graphics commands will do their work even while you're editing in 80-Column mode. Be sure you're in Slow mode, or you won't be able to see the graphics.

The only drawback to this technique is the wear and tear on the switch. If this bothers you, or if you're really in a hurry, you can use a third method: typing blind. Just keep the screen in Graphics mode while you type the commands. The fact that you can't see what you're typing doesn't mean it's not there. (Type in GRAPHIC 0 if you don't believe me.)

Channeling

With apologies to Shirley MacLaine—Direct mode offers more powerful channeling than any I've read about in the tabloids. You can use it to save and print out (on paper) all kinds of information. The key to using this power is knowing the ropes of the Open command.

The Open command establishes a line of communication between the comput- ►

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er and a peripheral. When using it, you must follow it with a file number (any number from 0 to 255 will do), then a device number. A device number of 3 accesses the screen (with some interesting possibilities), 4 accesses the printer, and 8–11 access the disk drives. After you've opened the channel, CMD gets the conversation going.

Let's say you want to turn your computer into a calculator, complete with printout, from Direct mode. Begin with OPEN 4,4,7:CMD 4, which will send anything you ask to be printed to the printer instead of the screen. For example, the Direct mode command PRINT 26 * 2 would send 52 to the printer.

That's easy enough. Now, what if you want to save your machine language disassembly from the built-in machine language monitor? The same OPEN and CMD line would work. Here's how they would look in a one-line stack:

```
OPEN 4,4,7:CMD4:MONITOR:D0E00
  0FFF
```

To exit the monitor, wait until the printing is done, then type X, and, finally, close the channel (CLOSE 4).

Opening a channel to the disk drive is even more handy, because you can use the newer command, DOpen. The line

```
DOPEN#2,"filename",W.:CMD2
```

will send information that would normally be printed to the screen to a file instead, thereby saving it. Be sure to have the ",W" tacked on to the end, so the computer knows it's to write information rather than read it.

Here's a sneaky trick: Use the Append command in Direct mode to tack messages on to the end of files. If you're too tired to boot up your word processor and wait for your diary file to load, type

```
APPEND#2,"Diary":CMD2:PRINT "Too
  tired today.":D CLOSE
```

press return and, sure enough, the phrase will appear at the bottom of your previous file (along with the Ready prompt).

By the way, the CMD command in the above cases isn't absolutely necessary. If you omit it, you can still print to the device that's open by using PRINT# instead of PRINT.

You can also read data in Direct mode—that is, if you cheat a little. The cheating is necessary because Basic 7.0 won't let you use GET# or INPUT# outside of Program mode. Begin by opening your file of choice, then insert the one-liner

```
0 GET#2,A$: PRINT A$;:IF ST=0 THEN 0
  :ELSE DCLOSE:RETURN
```

Now enter GOSUB 10 and watch the data flow past.

The best way to really squeeze the juice out of Direct mode is to try it yourself. The more you use it, the more you'll want to choose it. ■

Mark Jordan, who teaches high school English, has been in Commodore Programming mode during his spare time for many years.

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ProTips

Tips on how to use commercial productivity software, ranging from personalizing form letters to debugging a printer driver.

By HAROLD R. BJORNSEN

GEOS (VERSION 2.0): If you use a 1571 disk drive with this operating system, always choose the "Format both sides of disk" option, as it will give you twice as much room on a disk for files.

The best investment for GEOS is a 1764 REU. I've found the most productive way to employ the unit is to copy the frequently used applications onto a disk that contains the deskTop icon and a printer driver file. I then use the Commodore key to select the files I want to copy to the REU, and replace the disk with my data disk when the copying is complete. That way, I'm always working in the REU and need only access the drive when I save a file.

—JOEL M. SANDA
BOISE, ID

GEOS DESKTOP (VERSION 2.0): If you want to rearrange the files on a page, use this time-saving method. Using the Multi-file function (hold down the Commodore key while you point and click), pick up the files in the order you will eventually want them on your page. Move them to the border, then select all files (from the Select menu, or press Commodore/Y) and replace them on the page. They will be placed back in the order you picked them up.

—STEVE VANDER ARK
GRAND RAPIDS, MI

GEOWRITE: This GEOS program takes forever to redraw the screen if it is filled with your prose. And, if you use more than one font, geoWrite must access a drive to get the information for the new font; it does this every time the font changes on the screen.

One way around this is to use a 1750 REU, which costs around $200. However, if you don't want to spend that much money, here are a few tips to make your geoWriting easier. When you're typing, advance your text to the top of the screen now and then by moving down the page until there is only a line or two of text left at the top of the screen. This will ensure that GEOS has a minimum of text to redraw each time you shift around the screen. Or, you can speed things up by typing your text in BSW 9-point first, and then change the fonts when you're finished typing. Simply highlight the text you want to change, and then click on the Font box at the top of the screen. Select the font and appropriate point size, and geoWrite will do the rest. This trick also works with the options in the Style box.

—STEVEN JOHN SATAK
SEATTLE, WA

PAPERCLIP III: With this word processor, I can easily produce "personalized" form letters. I first load the form letter with the variable blocks. Then I open the variable datafile with control/shift Z, manually fill the blocks (control/shift V), edit the letter according to my needs, change the disk drive number to 9 (F1, F1), and save the "personalized" letter on unit 9. Next, I change the disk drive number back to 8, empty the blocks (control/shift N), and fill them again with the next variable data. If I want, I can edit this letter, too, and save it again on a disk on another drive. When all this is done, I print the letters, and each one is similar. This capability is undocumented in the users' manual.

—MICHAEL HABERMANN
BALTIMORE, MD

RUN SHELL: If you're a RUN Shell user (*RUN*, July 1989 and Super Starter Pak), you may become a little flustered at times when the program corrupts the operating system in both 64 and 128 modes. For instance, after copying some files and pressing the F1 key to exit RUN Shell, you may have discovered that the Run command no longer functions.

There's an easy, surefire solution that doesn't require powering down the computer. After exiting RUN Shell, enter SYS DEC("4000") on the C-128 or SYS 64378 on the C-64 to reset your computer. Now you have access to all Basic commands.

To reactivate RUN Shell, just type SYS 4864 in either 64 or 128 mode. You'll find that these tips will greatly increase the usefulness of both the 64 and 128 version of RUN Shell.

—PAOLO GHINQUE
BUFFALO, NY

WORD WRITER 4 (VERSION 9-1.2): I've found a bug in the Commodore MPS-1200 printer driver. To use Font mode, these switches must be set: SW1-2 (on), SW1-3 (on). This puts the driver into Epson/ASCII mode.

To use Draft mode, these switches must be set: SW1-2 (on), SW1-3 (on), SW1-7 (on, or linefeeds, option E, on). This puts the printer into Epson/ASCII mode with automatic linefeeds.

To format an 80-column document in a 40-column document, load the 80-column file and go to the top of the document. Then insert the checkmark (control/£) and enter "m,0,40". Next, run through the document and add hard returns (Commodore/R) at the end of each line. If you don't add these returns, the file will resave in its original format. Resave the file under a new name that reflects the format change.

—ALAN RATELIFF II
CANNON AFB, NM

WORD WRITER 128: The line that contains the checkmark, margin and line length information can be used as a REM line for special reminders such as naming which printer is to be used, or which printer codes apply. The term REM is not needed; the line will not go to the printer anyway.

The line that contains the checkmark and printer codes must not be used as a REM line. In fact, an invisible space after the code will cause the printer to ignore or misinterpret the directions. If you suspect this problem, run the cursor across the code line to see if it goes even one space too far to the right. If so, delete everything past the code.

—ROBERT M. MAYO
BATON ROUGE, LA ■

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From p. 6.

Basic program that was erased by the New command will be restored automatically. There's no need to remember any Pokes or other commands, and you don't have to load this handy utility before it's needed.

```
Ø REM UNNEW 64 - D.J. LAURIA          :REM*185
1Ø PRINT"{SHFT CLR}{CRSR DN}THIS PROGRAM C
   REATES A FILE NAMED UNNEW ON DISK."
                                      :REM*213
2Ø PRINT"{CRSR DN}PRESS ANY KEY TO BEGIN:
   "                                  :REM*236
3Ø POKE198,Ø:WAIT198,15:POKE198,Ø     :REM*11
4Ø FORI=1TO74:READA:N=N+A:NEXT        :REM*2Ø9
5Ø IFN<>6932THENPRINT"ERROR IN DATA STATEM
   ENTS.":END                         :REM*38
6Ø OPEN15,8,15,"IØ":OPEN8,8,8,"Ø:UNNEW,P,W
   ":INPUT#15,E,E$                    :REM*8Ø
7Ø IFETHENPRINT"{CRSR DN}DISK ERROR> {CTRL
    9}";E;E$:CLOSE8:CLOSE15:END       :REM*2Ø2
8Ø RESTORE:FORI=1TO74:READA:PRINT#8,CHR$(A
   );:NEXT:CLOSE8:CLOSE15:END         :REM*19
9Ø DATA 188,2,76,211,2,13,8Ø,82,79,71,82,6
   5,77,32,82,69,83,84,79,82,69       :REM*2Ø4
1ØØ DATA 68,46,13,13,169,1,141,2,8,32,51,1
    65,165,34,133,45,165,35,133,46    :REM*72
11Ø DATA 169,131,141,2,3,169,164,141,3,3,1
    62,Ø,189,191,2,32,21Ø,255,232     :REM*42
12Ø DATA 224,2Ø,2Ø8,245,32,96,166,1Ø8,2,3,
    139,227,188,2                     :REM*127
    3,198,32,228,255,2Ø1,Ø,24Ø        :REM*228
1ØØ DATA 249,24,2Ø1,89,2Ø8,3,1Ø8,254,2Ø7,2
    4,169,32,162,Ø,157,Ø,2,232,224:REM*11Ø
11Ø DATA 81,2Ø8,248,24,1Ø8,254,2Ø7:REM*177
```

—PAUL W. FRAZIER, LEBANON, PA

$5A9 More "New" Relief

A nice compliment to the above program is my Are You Sure? 64 program. Like the C-128, which gives you the "Are you sure?" prompt when you issue certain disk commands, this does the same when the New command is given in 64 mode.

To use it, just type in the listing, save it to disk, and then run it. Afterwards, whenever you type NEW, the "Are you sure?" prompt will appear. Pressing any key other than Y will preserve your file in memory. It's a great safeguard for anyone who programs in Basic on the C-64.

```
Ø REM ARE YOU SURE PROMPT 64 - PAUL FRAZIE
  R                                   :REM*195
1Ø FORJ=53Ø93 TO 53245:READ A:POKE J,A:NEX
   T:SYS 53Ø93                        :REM*186
2Ø PRINTCHR$(147)"'ARE YOU SURE ?' PROMPT
   IS ACTIVE."                        :REM*211
3Ø DATA 173,4,3,141,254,2Ø7,173,5,3,141,25
   5,2Ø7,169,124,141,4,3,169,2Ø7      :REM*16
4Ø DATA 141,5,3,96,173,Ø,2,2Ø1,78,24Ø,3,1Ø
   8,254,2Ø7,173,1,2,2Ø1,69,2Ø8       :REM*195
5Ø DATA 246,173,2,2,2Ø1,87,2Ø8,239,169,13,
   32,21Ø,255,169,65,32,21Ø,255       :REM*96
6Ø DATA 169,82,32,21Ø,255,169,69,32,21Ø,25
   5,169,32,32,21Ø,255,169,89,32      :REM*85
7Ø DATA 21Ø,255,169,79,32,21Ø,255,169,85,3
   2,21Ø,255,169,32,32,21Ø,255        :REM*215
8Ø DATA 169,83,32,21Ø,255,169,85,32,21Ø,25
   5,169,82,32,21Ø,255,169,69,32      :REM*151
9Ø DATA 21Ø,255,169,63,32,21Ø,255,169,Ø,13
```

$5AA No Overflow 64/128

Anyone who has tried to perform mathematical calculations on his or her Commodore knows the limitations of the 64/128. The largest number for which a factorial can be calculated is only 33, whereas a scientific calculator can compute 69.

No Overflow 64/128 alleviates that problem with a simple base-ten logarithm. My program lets your 64 or 128 calculate a factorial from any number up to 5109! Be forewarned, however, that the larger your number, the longer the calculations take.

```
Ø REM NO OVERFLOW 64/128 - DENNIS CULLEY
                                      :REM*77
1Ø INPUT "FIND FACTORIAL OF";N:F=1:P=Ø:C=1
                                      :REM*36
2Ø IFC+11<N THEN FOR X=C TO C+9:F=F*X:NEXT
   :C=C+1Ø:GOSUB 5Ø:GOTO2Ø            :REM*89
3Ø FOR X=C TO N:F=F*X:NEXT:GOSUB5Ø:REM*212
4Ø PRINTN;"FACTORIAL = ";F;"E";P:GOTO1Ø
                                      :REM*214
5Ø L=INT(LOG(F)/LOG(1Ø)):P=P+L:F=F/1Ø{UP A
   RROW}L:PRINTL: RETURN              :REM*186
```

—DENNIS ALLEN CULLEY, WEST CHICAGO, IL

$5AB Memory Display 64

Programmers, listen up! Tired of exiting your programs and typing PEEK (X) to find the value of a memory location? With Memory Display 64, the contents of any memory location are displayed in binary numerals in the upper-left corner of the screen.

After running Memory Display 64, which is relocatable in memory, you can enter a memory location for, say, joystick input, and watch the results as you move the joystick. While the number is displayed in white, you can change the color by entering POKE 828,X, where X is a number from 0 to 15.

```
Ø REM MEMORY DISPLAY 64 - STEPEHEN DIRSCHA
  UER                                 :REM*163
1Ø FOR T=828 TO 897:READ A:POKE T,A:NEXT
                                      :REM*1Ø6
2Ø INPUT "ENTER LOCATION";LC:HI=LC/256
                                       :REM*25
3Ø LO=LC-256*HI:POKE 861,LO:POKE 862,HI
                                      :REM*25Ø
4Ø SYS 828                            :REM*174
5Ø DATA 12Ø,174,2Ø,3,172,21,3,142,13Ø,3,14
   Ø,131,3,162,85,16Ø,3,142,2Ø,3      :REM*Ø
6Ø DATA 14Ø,21,3,88,96,169,128,141,132,3,1
   6Ø,Ø,173,133,3,45,132,3,2Ø5        :REM*24
7Ø DATA 132,3,24Ø,5,169,48,76,11Ø,3,169,49
   ,153,Ø,4,169,1,153,Ø,216,2ØØ       :REM*19Ø
8Ø DATA 192,8,24Ø,6,11Ø,132,3,76,92,3,76
                                      :REM*11Ø
```

—STEPHEN DIRSCHAUER, TORONTO, ONTARIO, CANADA ■

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GOLD MINE

Gaming tips this month include giving aid to your Contra and learning how to make your Last Ninja last longer.

By LOUIS F. SANDER

CONTRA: While in the tunnel scenes, if you drop to the floor and fire at the wall, you'll get a capsule, usually either Laser or Scatter Fire.

—BRITAIN WOODMAN
ANN ARBOR, MI

LAST NINJA 2: In Central Park, kill the thug in the theater. Punch the flashing light. Go back to the first screen and drop down the trapdoor. Get the key. The pieces for the numchucks are in the toilets guarded by the stick warriors. To get extra lives, eat lots of hamburgers. The shurikens are in the basket in the screen before the knife-throwing clown. To pass the clown, get as close as you can. Flip down the sidewalk instead of running. Get the map in the next screen. Climb up the iron gate, then walk south. Jump across the ledges in the next screen. Get the stick, then jump back. Climb down the iron gate backwards. Flip past the clown to the next screen north, then go west. Unlock the gate with your key. In the next screen, hop on the boat and wait until it stops before jumping to the other side. Go south. You must destroy the beehive with the shurikens.

In the city, the tools you must get are the sword, the manhole key and the drunk man's bottle.

In the sewer, get past the alligator by lighting the drunk man's bottle with the low-hanging torch. Use this Molotov cocktail like shurikens to destroy the alligator.

In the opium factory, climb the ladder and go south. Get the card key and go north, north, east. Enter the office and get the fried chicken in the dog bowl. Go down the ladder. Get as close to the rails as you can, and run across them as soon as the rail car passes. Play hopscotch over the crates to cross the moat. Go as southeast as you can, then dip the fried chicken in the open bag of opium. Go to where you enter the laboratory, then go east. Give the drugged fried chicken to the guard dog. Jump over him, then use the card key to enter the elevator.

In the office building, go into the first room and search the computer. Remember the four-digit number. In one of the rooms, there is a secret door, activated by tugging on a lamp string. To get past the fan, get against the wall and run north, north, east (your man will run in slow motion). Remove the screen door. Go outside the building and go south, south, west on the ledges. Climb the ladder. Wait until the helicopter goes away, then sprint off the north end of the building and flip.

In the mountain hideaway, push the firebutton when you are lined up with the ledge closest to the top of the screen. Jump south. Go to the bedroom and cut the rope off the bell ringer. There is a secret door down the stairs behind a plant. Fix the pipes with the rope; otherwise, you'll die if you try to pass through the steam.

In the final confrontation, pull on the Oriental wall rug. Open the safe using the code from the computer, then take the disk out. To kill the man in white, you have to strike him down in the middle of the room and light all the candles. (I find it's easiest to light all the candles except one, then strike him down. When he's unconscious, I light the last candle to "lift his spirits.") Put the disk back into the safe, then accept my congratulations for completing this excellent game!

—RAYMOND W. LOUIS
KINGS PARK, NY

NEUROMANCER: The biggest hint I can give is to read the book. This will give you information on the world and the characters, and an understanding of some of the inside jokes.

As soon as possible, move all or most of your money to another bank. The Justice Department can only get at the money in the PAX Bank.

Use the message from Armitage to get more money. Answer the message, transfer the money to your credit chip, then get arrested and fined. Alternatively, you can transfer all the money from the bank to your credit chip, then get arrested and killed. If you have nothing in your chip, having your brain kickstarted costs nothing.

Get a job, but don't apply for it. Instead, use a corporate database that lets you edit employee names and ID numbers, put your own name into the database, then go and collect your paycheck.

Larry Moe can be a hindrance to you, since he won't let you by. Find his ID in the corporate databases, then give it to the police.

Use skill chips to combat Artificial Intelligences (AIs). You can use the Psychotherapy skill to determine their current weakness, then hit them with whatever skill is appropriate.

Don't worry about old friendships when buying a cyberspace deck. You can get ten percent off anything at Asano Computing if you insult Crazy Edo.

Watch out for the program from CFM. It will destroy you.

In cyberspace Zone 0 (Cheap Hotel), AIs are in the Psychologist and Chess Databases. The databases with the most useful software are Regfellows (208/32) and Panther Moderns (224/112).

When you're near the man in Zion Cluster, don't mention anything having to do with computers, cyberspace or banks. It will offend him, and he'll send you back to Chiba City. He is, however, impressed by a good musician.

Avoid the Massage Parlor. You may learn something important, but you'll get arrested.

—JOSHUA BRANDT
STAYTON, OR ■

Send your C-64 or C-128 game tips to Gold Mine, PO Box 101011, Pittsburgh, PA 15237. Put your name, complete address and Social Security number on every sheet of paper you send, and please use 8½-by-11-inch paper. Be sure to state which Commodore computer your tip is for. RUN *pays $5 per submission upon publication.*

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GEOWATCH

For geoBasic owners who want to create stand-alone applications, this program helps you save memory and disk space.

By WILLIAM COLEMAN

GEOBASIC LETS YOU create "stand-alone" applications; that is, programs that can run without the need for the geoBasic file itself. Unfortunately, however, a stand-alone geoBasic file takes up much space, approximately 30K. I wrote geoStripper to remove extraneous data and return your program to the size of the original source code. GeoStripper, a short GEOS program, runs on any version of GEOS, in either 64 or 128 mode.

Type in Listing 1, using *RUN*'s Checksum program to catch any typing errors. Then save the program to disk with a filename other than geoStripper. Next, place a GEOS work disk in drive 8 of a 1541 or 1571—*not a 1581*—disk drive. When you run the program, it creates geoStripper on the work disk.

GeoStripper is easy to use: You simply double-click on the geoStripper icon. You'll then see a list of the stand-alone files on the disk. Select the file you want to strip and click on open. You can also click on the Disk icon if you want to insert a different disk. For those users with more than one drive, I've included a drive icon that toggles among drives A, B and C.

Note that geoStripper directly modifies the file you've selected, so always make a duplicate of that file *before* stripping. R

William Coleman, a tester of geoBasic as it was going through its development stages, now monitors RUN's *geoBasic area on QuantumLink.*

Listing 1. Create geoStripper program. (Available on ReRUN disk. See order card facing page 48.)

```
Ø REM * CREATES GEOS PROGRAM GE
  OSTRIPPER *            :REM*161
1 DR=8:FI$="GEOSTRIPPER":TY$=CH
  R$(6):GOTO 9           :REM*77
2 HI=INT(A/256):LO=A-HI*256:PRI
  NT#15,"M-R"CHR$(LO)CHR$(HI)
                         :REM*211
3 GET#15,A$:A=ASC(A$+CHR$(Ø)):R
  ETURN                  :REM*82
4 PRINT#15,"U1:"2;Ø;TR;SC:RETUR
  N                      :REM*134
5 PRINT#15,"U2:"2;Ø;TR;SC:RETUR
  N                      :REM*254
6 PRINT#15,"B-P:"2;PS:RETURN
                         :REM*77
7 GET#2,A$:A$=LEFT$(A$+CHR$(.),
  1):RETURN              :REM*23Ø
8 PRINT#2,CHR$(A);:RETURN
                         :REM*11Ø
9 DIM D$(29):PRINT "CREATING "F
  I$:OPEN3,DR,3,FI$+",U,W"
                         :REM*157
1Ø READ A$:PRINT ".";:IF A$="-1
  " THEN CLOSE 3:GOTO 15
                         :REM*97
11 FOR I=1 TO LEN(A$):IF MID$(A
   $,I,1)=" " THEN A$=LEFT$(A$,
   I-1)+MID$(A$,I+1)     :REM*217
12 NEXT:FOR I=1 TO LEN(A$) STEP
    2:H$=MID$(A$,I,1):L$=MID$(A
   $,I+1,1)              :REM*227
13 H=16*(VAL(H$)-(H$>"@" AND H$
   <"G")*(ASC(H$)-55)) :REM*192
14 PRINT#3,CHR$(H+(VAL(L$)-(L$>
   "@" AND L$<"G")*(ASC(L$)-55)
   ));:NEXT:GOTO 1Ø      :REM*132
15 OPEN 15,DR,15:OPEN 2,DR,2,"#
   ":OPEN 3,DR,3,FI$:CLOSE 3
                         :REM*237
16 A=656:GOSUB 2:DB=A:A=66Ø:GOS
   UB 2:DE=A:TR=18:SC=DB:GOSUB
   4                     :REM*236
17 PS=DE:GOSUB 6:FOR I=Ø TO 29:
   GOSUB 7:D$(I)=A$:NEXT:TR=ASC
   (D$(1))               :REM*189
18 SC=ASC(D$(2)):GOSUB 4:GOSUB
   7:XT$=A$:GOSUB 7:XS$=A$:GOSU
   B 4                   :REM*6Ø
19 A=Ø:GOSUB 8:A=255:GOSUB 8:A=
   3:GOSUB 8:A=21:GOSUB 8:GOSUB
    5                    :REM*14Ø
2Ø D$(19)=D$(1):D$(2Ø)=D$(2):D$
   (1)=XT$:D$(2)=XS$:D$(21)=CHR
   $(Ø):D$(22)=TY$       :REM*56
21 D$(23)=CHR$(9Ø):D$(24)=CHR$(
   Ø7):D$(25)=CHR$(3Ø):D$(26)=C
   HR$(11)               :REM*174
22 D$(27)=CHR$(23):TR=18:SC=DB:
   GOSUB 4:PS=DE:GOSUB 6
                         :REM*249
23 FOR I=Ø TO 29:PRINT#2,LEFT$(
   D$(I),1);:NEXT:GOSUB 5:CLOSE
    2:CLOSE 15           :REM*42
24 PRINT:PRINT "DONE!":END
                         :REM*254
25 :                     :REM*83
26 DATA Ø315BFFFFFFØ8ØØØ18BF 8Ø
   14AØ8Ø12BF8Ø1F84ØØ Ø18EØØØ18
   4ØØØ1BF97F1           :REM*155
27 DATA AØFC13BF97F58ØØØ8987 FF
   9184ØØ338EØØ5F84ØØ ADBF81D9A
   Ø82F1BF8261           :REM*194
28 DATA 84Ø1C1FFFFFF83Ø6ØØØØ Ø4
   FFØ3ØØØ46762537472 697Ø7Ø657
   22Ø2Ø56312E           :REM*75
29 DATA 3ØØØØØØØ4Ø57696C6C69 61
   6D2Ø432E2Ø436F6C65 6D616E2ØØ
   ØØØØØØØØØØ           :REM*66
3Ø DATA ØØØØØØØØØØØØØØØØØØØØ ØØ
   ØØØØØØØØØØØØØØØØ ØØØØØØØØØ
   ØØØØØØØØØØ           :REM*98
31 DATA ØØØØØØØØØØØØØØØØ5475 72
   6E732Ø612Ø5374616E 642D416C6
   F6E652Ø6765           :REM*1Ø1
32 DATA 6F4261736963205Ø726F 67
   72616D2Ø6261636B2Ø 696E746F2
   Ø736F757263           :REM*141
33 DATA 652Ø636F64652EØØØØØØ ØØ
   ØØØØØØØØØØØØØØØØØØ ØØØØØØØØØ
   ØØØØØØØØØØ           :REM*248
34 DATA ØØØØØØØØØØØØØØØØØØØØ ØØ
   ØØØØØØ2Ø3DØ52Ø32Ø5 2Ø5AØ5A9Ø
   985ØFA94B85           :REM*73
35 DATA ØE2ØØBC2AØ16A9Ø791ØC 2Ø
   E7C12ØF6Ø4AD148485 Ø5AD13848
   5Ø42ØE4C12Ø           :REM*36
36 DATA F6Ø4AØ79B98CØ699Ø28Ø 88
   1ØF72ØE7C12ØF6Ø4A9 Ø985Ø3A94
   B85Ø22Ø74C2           :REM*1Ø6
37 DATA 2ØF6Ø4A9ØØ8D96842Ø83 C2
   2Ø86C2EE9684AD9684 C9ØA9ØFØ2
   Ø77C2AD8D84           :REM*2
38 DATA C9Ø39ØØ3CE8D84AD4AØ9 2Ø
   BØC22ØA1C24C2CC2A5 BA8D4AØ98
   D49Ø9AD8D84           :REM*59
39 DATA C9Ø1FØ25ADØFCØC92Ø9Ø 1E
   AD9Ø84FØ1929ØF8D48 Ø9AD8E842
   9ØFCD48Ø9FØ           :REM*232
4Ø DATA Ø7ADC488294ØFØØ3EE8D 84
   4CE1C1AE8D84CAFØ15 2ØDØØ48D4
   9Ø92ØBØC22Ø           :REM*67 ►
```

RUN it right: **C-64 or C-128; 1541 or 1571; GEOS (any version)**

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```
41 DATA A1C28AF00620B4B07B850 EB
   60AD8D84C901F01B18 690088D480
   9AD490891869           :REM*91
42 DATA 01CD480990002A9008A8B9 86
   84F0F0986 0AD490960 8AF005686
   84C4B0760A9            :REM*224
43 DATA 12CD0FC01007AD13C010 02
   A53F60ADB784D01CA9 1AA2054C3
   6052032 05A5           :REM*140
44 DATA 0718690885071 8A90865 0A
   850A9002E60B4C24C1 A90EA2058
   DB1848EB284            :REM*0
45 DATA 60A902203 9C1A9808 52F 20
   FF043 00EAD008C8D58 0520B4C1E
   803008C0060            :REM*136
46 DATA 20FF041020ADFD05098 8D
   FD05AD02060980 8D02 06AD0D060
   9808D0D06AD            :REM*153
47 DATA 8006098 08D8 0062 07D04 A9
   068D7D06A9268D7C06 AE8D84CAD
   0080A9008D7C           :REM*104
48 DATA 068D7D06A9068D1406A4 BA
   B986841005A9008D14 0620A1C22
   01D07A9008D            :REM*89
49 DATA 4B09A9 985 0DA94B850C A9
   06851 0A9 68517A923 8516A9058
   503A9FB8502            :REM*188
50 DATA 2005 07A502C902D0034C 67
   04C906D00EA9 0785 03 A98F85022
   0050 7B850AA           :REM*177
51 DATA C914D0062 0B404B850A0 60
   810B820A18060B8214 5C091004 0
   40511191211            :REM*197
52 DATA 3B7C06021 14C06112A00 18
   6F6E206469736B3A1B 00C2DF000
   5FF82FE8004            :REM*207
53 DATA 00820380040 0B8038 0F8 00
   C0000380CC0000000 3 80C6FDD99
   E0380C6E0D9            :REM*91
54 DATA B30380C6C0D9B3038 0C6 C0
   CF3F0380C6C0CF3003 80CCC0C63
   3038 0F8C0C6           :REM*51
55 DATA 1E0380040082038004 00 81
   0306FF817F05FF0CBF 2606 00000
   61084 06A914           :REM*6
56 DATA 8D1D854CBFC2 0315BFFF FF
   F0800018BF80 14A080 12BF801F8
   4000 18E001            :REM*7
57 DATA 840001BF8BF9A0FE09BF 8B
   F9800080187FF8184 00 0 18E0 0018
   4000 1BF8001           :REM*48
58 DATA A080 01BF800184000 1FF FF
   FF83061000 4FF03 00 0 46261736
   9632070726F            :REM*192
59 DATA 6720205631 2E3 0000000 00
   0000000000000000000 0000000000
   000000000000           :REM*72
60 DATA 0062617369630 0A97185 3C
   A900853BA9E5853A20 FF041004 0
   63A263B4C56            :REM*111
61 DATA C2AD490938E9080AA8B9 45
   0785 02B946 0785 03A0 00B102F00
   AC9A0F00699            :REM*250
62 DATA 5C09C8D0F2A9009 95C09 60
   1E843084DC88E020B0 07CA8A0AA
   8B85021E073            :REM*76
63 DATA D00AA90885 0DA9F785 0C D0
   1DE02A900AA9 0985 0D A90485 0CD
   00F8AE9130A            :REM*220
64 DATA A8B91A0985 0CB91B0985 0D
   A90785 03A9BC85022 0 05074C67 0
   4810B1 01099           :REM*132
65 DATA 07011148001849 6E7365 72
   742 06E65772 0646973 6B2 0696E7
   46F2 0646973           :REM*22
66 DATA 6B2 064726976652E1B00 81
   0B101 0A909C1 03 0C 011148004
   E6F742 0456E           :REM*43
67 DATA 6F7567682 0426C6F636B 73
   00496E76616C69642 0 547261636
   B00496E7375            :REM*242
68 DATA 6666696369656E742053 70
   616365004675 6C6C2 0 446972656
   3746F727900            :REM*46
69 DATA 46696C652 04E6F742046 6F
   756E64004261642042 414D2 0696
   E2044726976            :REM*204
70 DATA 6500556E6F70656E6564 20
   564C49522 046696C65 00537472 7
   56374757265            :REM*139
71 DATA 204D69736D6174636800 42
   756666657220 4F7665 72466C6F7
   700435F4552            :REM*224
72 DATA 5200 4E6F2 04465766963 65
   00 4E6F2 04865616465 7200556E6
   66F726D6174            :REM*174
73 DATA 746564204697 36B00 4E 6F
   2044617461 2042 6C6F 636B00446
   17461204368            :REM*241
74 DATA 65636B73756D00496E63 6F
   6D70617461626C652 0 46696C657
   4797065730 0           :REM*29
75 DATA 577269746520 56657269 66
   7900577269746520 5 0 726F74656
   3740 0486561           :REM*179
76 DATA 6465722043686 5636B73 75
   6D00494420 4D69736D 617463680
   0444F5320 4D           :REM*167
77 DATA 69736D617463680 03F3F 3F
   3F3F00182A2 0446973 6B2045727
   26F7220 2A00           :REM*118
78 DATA CA07DC07EA07FD07 0C08 1B
   082C08040904093F08 5208620 86
   8087208 7C08           :REM*230
79 DATA 8D089B08A908C008CD08 DB
   0804 09EB08            :REM*130
80 DATA -1                :REM*193
```

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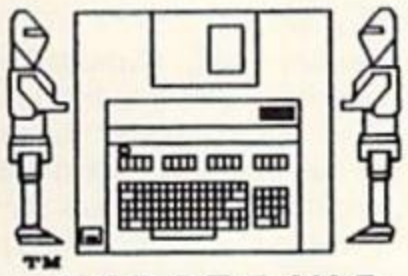

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COMMODORE CLINIC

Autobooting, sticky keys, and a one-dimensional 1571 are this month's fare.

By ELLEN RULE

Q *I'm using my C-64 in a dedicated application, and I'd like the computer to automatically load and run a program stored on disk when the power is turned on. That way, if there's a power failure, the system will automatically recover when the power is restored. I've written a machine language program (derived from an example in the* C-64 Programmer's Reference Guide*) that can automatically load a program named Autostart, but I don't know how to make it run. Is there an addition I can make to my current machine language program that would run the program? Or is there an expansion cartridge available that does what I've described?*

—BRIAN TORR
SANTA ROSA, CA

Q *I'd like to add autoboot features to GEOS. Is this possible, and if so, how do I go about it?*

—RYAN OLSON
SIMI VALLEY, CA

A The Quick Brown Box (QBB) cartridge, from Brown Boxes, Inc. (26 Concord Rd., Bedford, MA 01730), will provide the exact autostart capabilities you are looking for. A program that is included on the Brown Box utility disk will load and run the first program on your disk. Depending on the size of your application program, and whether it's copy-protected, you may be able to install the application program in the QBB cartridge.

The QBB comes in 64K, 128K and 256K configurations. Brown Boxes has supplied cartridges for many dedicated applications and provides excellent ongoing support.

As for autobooting GEOS, Joe Buckley at Storm Systems has developed programs for booting and autobooting GEOS out of the QBB in both 64 and 128 modes, using Commodore's REU. For more information, contact Storm Systems at 464 Beale St., W. Quincy, MA 02169.

Q *On a number of occasions, the return key on my C-64 has stuck and become inoperative, and I've needed to send the computer out for repairs. Now the cursor-up/down key and, at times, the left shift key won't function. What do you think is the problem?*

—DAVID P. HOLMAN
ERIE, PA

A Without knowing what you were told by the repair technician, I can guess that the problem lies either with the keyboard itself or with the CIA chip that receives the keyboard signal.

When a key is pressed, the metal coating on the bottom of the key makes contact with a small metal pad, causing a short between a row and a column on the keyboard matrix, which sends a signal to the operating system. The metal coating is extremely sensitive to smoke and dirt.

A polymer keyboard protector called SafeSkin, manufactured by Merritt Computer Products, Inc., (5565 Redbird Center Drive, Suite 150, Dallas, TX 75237) can protect your keyboard from liquids and airborne pollutants. Unlike dust covers, SafeSkin stays in place even during keyboard use. Look for this product in your local office supply or computer store. If you can't find SafeSkin in a store near you, try The Memory Location (396 Washington St., Wellesley, MA 02181). Of course, you can also protect your computer's components by reducing airborne pollutants such as smoke.

Some Commodore owners clean their keyboard contacts themselves. This requires some technical expertise, as you must not only open the computer but desolder some wires. Isopropyl alcohol is recommended by computer technicians to remove residue on the keyboard contacts. A word of warning, however: *Don't* use silicon-based keyboard cleaners. These are really meant for typewriter keyboards and leave an oily residue.

There may be an electronic cause for the problem, rather than a mechanical one. The same CIA chip that receives the keyboard input also receives signals from the two joystick control ports. Normally, the keyboard and the joysticks are not made to perform at the same time, so there's no signal conflict. A faulty joystick (sending a continuous signal) or even a joystick that's out of position can corrupt the signal from the keyboard. The next time your keyboard acts strangely, try unplugging the joystick to see if the problem disappears. A Commodore-authorized technician can run diagnostics to determine if a CIA chip needs replacement or whether the problem lies with your keyboard.

Q *My 1571 disk drive works fine loading files, but when it comes to formatting a new disk or saving a file, it doesn't seem to work. Is it possible for a drive to stop formatting and saving, yet do other things?*

—ROSS BELT
OAKLAND, CA

A In the disk drive, a photosensitive switch paired with an LED light source indicate whether the disk is write-protected. The signal this setup produces is sent to a chip that enables the drive's write capabilities. During normal use, a write-protect tab applied to a disk prevents the LED light from reaching the detector. Then the switch sends a signal that the disk is write-protected, and the drive won't write to the disk. Without a tab, the disk is write-enabled.

Failure on the part of the write-protect circuitry will prevent the disk drive from writing to the disk, whether it be to format or save. After you attempt a drive operation, a blinking light on the front of the drive may be a clue that such an error has occurred. A qualified technician can determine whether your problem is with the LED or the drive's electronic circuitry. ■

Do you have questions about your Commodore computer system, software or programming? Just send them to Commodore Clinic, RUN Magazine, 80 Elm St., Peterborough, NH 03458. Queries are answered only through this column, and, due to the volume of mail, only those likely to appeal to a majority of our readers can be published.

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RUN's Checksum & Program Typing Hints

TYPE IN *RUN*'S CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running it. When typing in a program from *RUN*, first load and run *RUN*'s latest version of the Checksum program, which contains a new feature explained below. The screen will display a SYS number (49152 for the C-64; 3328 for the C-128) that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

When you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line as you typed it is correct. If the number that appears doesn't match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the appropriate SYS number, and save the finished program.

We sometimes get letters and phone calls from new readers who have typed in the Checksum program for the first time. They are confused by the "Out of Data Error in Line 30" message that appears when they try to run the Checksum program. Understandably, they compare line 30 of the listing with line 30 as they typed it in, and cannot find anything wrong. The message unintentionally misleads them into thinking the error is in line 30, whereas the typing mistake is actually somewhere in one of the Data statements in lines 190–350.

So, we've added a new feature to the Checksum program that alerts readers to the number of the Data statement line in the Checksum program where an error has actually been made. **Note that this feature works *only* on the Checksum program itself, and not on any other program listing in *RUN*.**

After you've entered and saved the Checksum program to disk, run it. If you've made any errors in any of the Data statements, the program will give you a specific line number. Find the mistake, correct it, press return, save the program and run it again. Repeat this procedure until the Checksum program runs flawlessly.

Control Characters Demystified

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key once. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACES}—press the space bar 22 times.

{SHIFT CLR}—hold down the shift key and press the clr-home key once.

{2 CRSR DNs}—press the cursor-down key twice.

{CTRL 1}—hold down the control key and press the 1 key.

{COMD T}—hold down the Commodore logo key and press the T key.

{5 LB.s}—press the British pound key (£, *not* #) five times.

Refer to the following paragraphs for any other Error messages you get from running any program listing in *RUN*.

Other Error Messages

Having heard from many users over the years about their difficulties with typing in listings, we've identified a few recurring problems that plague many people but are easy to fix. So read on and see if your problem is one of these.

- You get an "Out of Data in Line xxx" message. This means that a program line was reading from Data statements and reached the end of the data before it was done reading. There are two possible problems.

One might be with the program line that reads the data, usually a For-Next loop. Make sure you have the proper values for the loop, because if, for example, the listing has a loop of 0 to 150, and you've typed 0 to 160, you'll get the Out of Data message. If the loop is correct, then the problem lies in the Data statements themselves. One possibility is that you omitted a whole line of data. That's easy enough to find and correct. It's more likely that you've skipped one or more individual data items or typed in a period instead of a comma, which causes two data values to be read as one number. Check your typing carefully against the listing. Using *RUN*'s Checksum program when you type in listings from the magazine should help in this case.

- You get an "Illegal Quantity Error in Line xxx" message. This means you've read a number from a Data statement and tried to poke it into a memory address. The error occurs because the number is larger than 255 (the largest value a memory address can contain), which means that somewhere in your Data statements you've made an error by typing in a number larger than 255. Again, this is easy to check for and correct. First look in your Data statements for a number larger than 255. You might have added an extra digit, or perhaps you ran two numbers together (23456 instead of 234,56).
- You get a "Syntax Error in Line xxx" message. This could be almost anything. What it tells you is that there is something wrong in the indicated line. Usually you've misspelled a Basic keyword or omitted some required character. List the line and examine it carefully.
- You get an "Error in Data" message. This occurs in programs that add up all the data as read, and, when finished, compares that sum with what it should be if the data were typed in correctly. If it isn't the same, it means an error somewhere in typing the Data statements. Go back and check the data carefully. Correct the mistake(s), save the new version and try again.
- Finally, we urge everyone who intends to type in one of our listings to use *RUN*'s Checksum program, which will help you avoid every mistake we've mentioned above, except that it won't detect the omission of a line. R

Listing. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(40960)THEN MO=64:SA=49152
30 I=0:CK=0:CH=0:LN=190
40 FOR K=0 TO 16
50 FOR J=1 TO 10:READ B:IF B>255 THEN GOTO 170
60 CH=CH+B:POKE SA+I,B:I=I+1:NEXT
70 READ LC
80 IF LC<>CH THEN GOTO 170
90 CH=0:LN=LN+10
100 NEXT K
110 POKESA+110,240:POKESA+111,38:POKESA+140,234
120 PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
130 PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128 THEN 1
    60
140 POKESA+13,124:POKESA+15,165:POKESA+25,124:POKESA+2
    6,165
150 POKESA+39,20:POKESA+41,21:POKESA+123,205:POKESA+12
    4,189
160 POKESA+4,INT(SA/256):SYS SA:NEW
170 PRINT"YOU HAVE A DATA ERROR IN LINE ";LN;"!":END
180 REM DO NOT CHANGE THESE DATA STATEMENTS!
190 DATA 120,162,24,160,13,173,4,3,201,24,884
200 DATA 208,4,162,13,160,67,142,4,3,140,903
210 DATA 5,3,88,96,32,13,67,152,72,169,697
220 DATA 0,141,0,255,133,176,133,180,166,22,1206
230 DATA 164,23,134,167,132,168,170,189,0,2,1149
240 DATA 240,58,201,48,144,7,201,58,176,3,1136
250 DATA 232,208,240,189,0,2,240,42,201,32,1386
260 DATA 208,4,164,180,240,31,201,34,208,6,1276
270 DATA 165,180,73,1,133,180,230,176,164,176,1478
280 DATA 165,167,24,125,0,2,133,167,165,168,1116
290 DATA 105,0,133,168,136,208,239,232,208,209,1638
300 DATA 169,42,32,210,255,165,167,69,168,170,1447
310 DATA 169,0,32,50,142,169,32,32,210,255,1091
320 DATA 32,210,255,169,13,32,210,255,104,168,1448
330 DATA 96,104,170,24,32,240,255,104,168,96,1289
340 DATA 56,32,240,255,138,72,152,72,24,162,1203
350 DATA 0,160,0,32,240,255,169,42,208,198,1304
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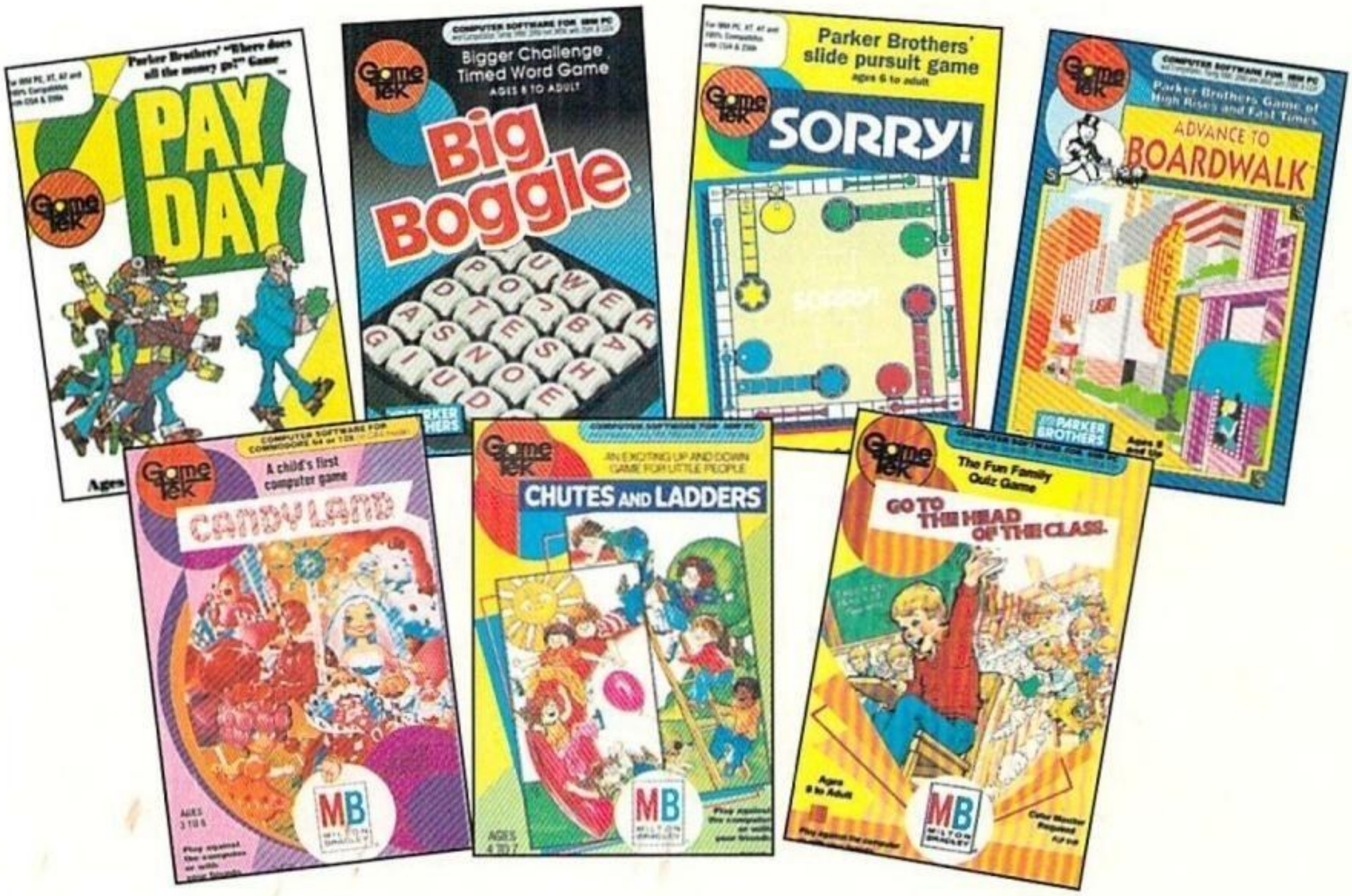
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